

In This Issue—An Engineer's Vision of Service

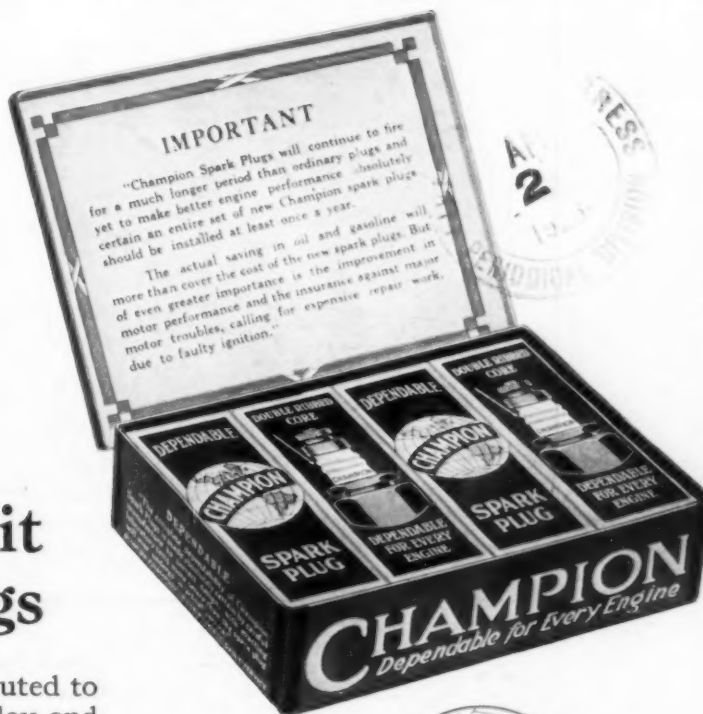
MOTOR AGE

Vol. XLIII
Number 13

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, MARCH 29, 1923

Thirty-five Cents a Copy
Three Dollars a Year

86



New Champion Service Kit for Spare Spark Plugs

The Champion Service Kit, now being distributed to the trade, insures the motorist against delay and inconvenience on the road due to spark plug troubles.

In this strongly made box of durable metal he can carry a full set of either four or six dependable Champions ready for every emergency.

Every motorist will readily see the advantages of the Champion Service Kit. It will aid the dealer in selling complete sets of Champion Spark Plugs. Order a supply of these kits at once and be ready for a big Champion business with the opening of the touring season.

Champion Spark Plug Company, Toledo, Ohio
Champion Spark Plug Company of Canada, Limited, Windsor, Ont.

*It is Champion's ideal to build its own business by
building sound, profitable business for the dealer*



CHAMPION

Dependable for Every Engine

SUNBEAM VISOR

Display Stand



Merchandise
well
displayed
is half
sold

For Every Sunbeam Dealer

Here is the most practical sales help we can offer Sunbeam Visor Dealers — the Sunbeam Display Stand. The stand, equipped with three visors, makes a wonderful silent salesman. It gives the car owner who comes into your place of business a chance to sell himself. **Merchandise well displayed is half sold.**

The Stand is beautifully finished, and, is furnished to any Sunbeam Visor Dealer for a deposit of \$1.50. The dealer has the privilege of returning the Stand for credit at any time. Order one today for your display room.

The Sunbeam Line Includes

A visor for every make of car, open or closed. There is a range of prices to meet every pocket-book, with a good margin of profit for the Dealer. VITROLITE, used in Sunbeam Visors exclusively, and furnished in Royal Purple or Green, is the best visor material that can be produced—your cus-

tomers will be pleased with it.

The "SUNBEAM "G" line, furnished in Green and Amber Thoma Process quarter-inch Ribbed Glass, is a Visor of real quality for the popular priced cars. Sunbeam Junior is for Ford cars only—open and closed models.

SOLD BY LEADING JOBBERS EVERYWHERE

MANUFACTURED BY

THOMAS & SON-INC.
Everything in
Glass for the Automobile

FAIRFIELD, IOWA

Tribune

The New York Times

Winners in First
HERALD

Stewart
VACUUM TANK and SPEEDOMETER

WATCH YOUR SPEEDOMETER

Stewart
BUMPERS

Stewart
SEARCHLIGHT and STOPLIGHT

Stewart
CRASH!

THIS IS YOUR ADVERTISING

Outdoor posters and paint boards covering the nation—55 largest newspapers with country-wide circulation—full pages in the Saturday Evening Post. This is your advertising—selling your customers on Stewart Custombuilt Accessories.

Are you taking advantage of it now—are you displaying Stewart Necessities in your window—in your show-case? Mail the coupon for the Stewart Lever which will tell you how you can tie up with this advertising.

STEWART-WARNER SPEEDOMETER CORPORATION · CHICAGO, U. S. A.

Stewart
CUSTOMBILT ACCESSORIES
USED ON 8 MILLION CARS

Stewart
CRASH!

Stewart
CRASH!

Stewart
CRASH!

ADV. DEPT. — Stewart-Warner Speedometer Corp.

I have not received the Stewart Lever. Please place my name on mailing list.

Name _____

Street _____

Town _____ State _____

Saved \$800⁰⁰ a Year

—and Got All **THIS** Besides



PAUL J. KILLEEN, PRES.
TIRES AND TUBES
AUTO ACCESSORIES
VULCANIZING
G. M. C. TRUCKS

KILLEEN-BUICK COMPANY
BUICK AUTOMOBILES AND SUPPLIES
DEALERS FOR ROCK COUNTY
78-87 NORTH CHERRY STREET
GALESBURG, ILL.

P. C. ENO, MANAGER
DELCO-LIGHT
FOR FARMS
ELECTRIC GOODS
FOR CITY AND COUNTRY

January 19, 1923

Burroughs Adding Machine Company,
Detroit, Michigan.

Gentlemen:

Since we installed our Burroughs, we are handling our office work with one less person than with the old method, making a saving of \$800 a year.

Our customers' statements are now posted daily showing the name of each item and the price charged, and these statements are in the mail the same day we close our books. Our figures are always deadily accurate.

We keep a perpetual inventory of the different lines of goods we handle and are able to take off a balance sheet and financial statement, also statement of operations covering sales, gross profits, itemized expenses and net profits by departments within a few minutes' time.

We postponed buying this machine for three or four years, which we regret very much as we feel that it would have paid for itself several times over simply by giving us a better knowledge and control over our business.

We would not care to go back to our old method.

Yours truly,
KILLEEN-BUICK COMPANY
By *Paul J. Killeen*
Pres.

RJK:PJ

BETTER FIGURES *for* BIGGER PROFITS

Burroughs

ADDING • BOOKKEEPING • BILLING • CALCULATING MACHINES

Other car and accessory dealers and garages are as enthusiastic about the Burroughs Simplified Accounting Plan as the Killeen-Buick Co.

Here are typical examples of hundreds of letters.

"We take off a profit and loss statement monthly. With the information given us, we

always know exactly where we stand every day."—Calavada Auto Company, Inc. (Ford Cars and Fordson Tractors) Reno, Nevada.

"The most important feature of all is the simplicity of the system. I believe that any clerk with ordinary intelligence can successfully operate it."—Eisele Motor Company (Dodge Cars) La Salle, Ill.

Burroughs Adding Machine Co.,
6013 Second Blvd., Detroit, Mich.

Please send complete information about the Burroughs Simplified Accounting Plan for garages.

☐ Garage ☐ Car Dealer ☐ Accessories Store

Name

Address

MOTOR AGE

Published Every Thursday by
THE CLASS JOURNAL COMPANY
 MALLERS BUILDING
 59 East Madison Street, CHICAGO

Vol. XLIII

Chicago, March 29, 1923

No. 13

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| SUBSCRIPTION RATES | |
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| United States, Mexico and U. S. Possessions..... | \$ 3.00 per year |
| Canada | 5.00 per year |
| All Other Countries in Postal Union..... | 6.00 per year |
| Single Copies | 35 cents |

Subscriptions accepted only from the Automotive Trade

Entered as Second Class Matter Sept. 19, 1899, at the Post Office at Chicago, Ill., under Act of March 6, 1879.



The deeper meaning of a Goodrich sign

When you see a Goodrich sign on a tire dealer's store it does not simply mean that Goodrich Tires are sold there.

It means: "Here is a dealer who thinks so much of what his customers will be saying about him next year that he is insuring their loyalty."

"He is dealing in goods that he knows are of one quality only."

He is selling tires which have built up a name and reputation that is as much of an asset to him as it is to Goodrich.

"He knows that the high standing of one quality in materials and one quality in workmanship is converted into a characteristic of his own business."

The Goodrich plan of co-operating with the dealer is interesting, because it is successful. Dealers who want to build permanently are invited to write for details.

The

B. F. GOODRICH RUBBER CO.
 Akron, Ohio

Goodrich

TIRES

"Best in the Long Run"

An Impressive Quietness of Operation That Speaks Volumes for Quality

THERE is just that about a Usaco Air Compressor—an impressive quietness—an unlabored operation, in fact, an eagerness to operate that is dependable evidence of inbuilt quality.

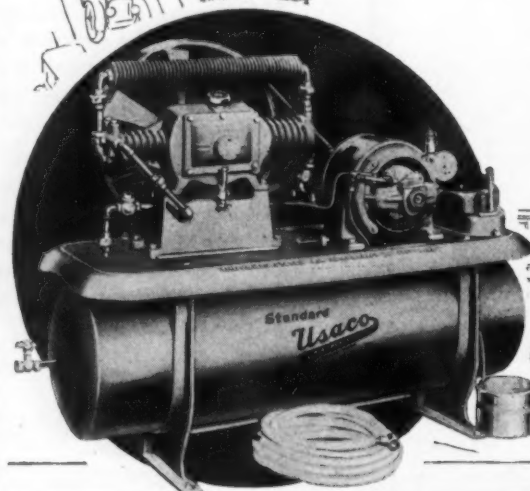
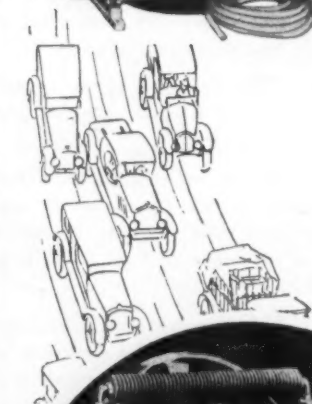
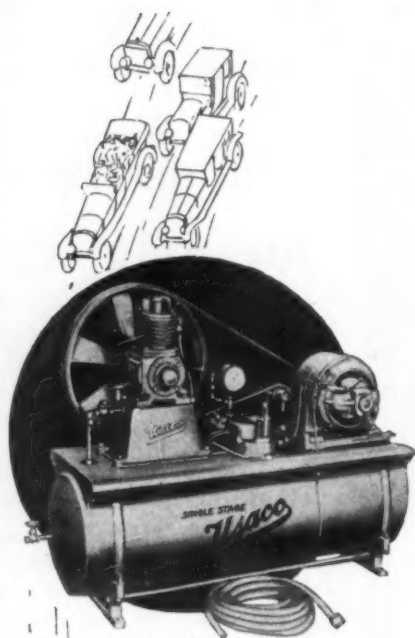
Contributing to this are: perfectly balanced parts; harmonious relation of one unit to another; exceptionally well finished surfaces, and last, but not least, the long "running-in" test that proves every compressor up to the high Usaco standard before it is shipped.

Man's intelligence is so reflected in a Usaco Compressor that it seems almost human itself. To see it start just at the right moment, pick up the load only after full speed is attained; pump with eagerness; stop when full pressure is attained and discharge any oil or moisture that may have accumulated in the filtering trap, is to recognize a machine of top notch, incomparable quality.

The new Usaco Perfect Balance Air and Water Tower is, likewise, a masterful achievement.

The United States Air Compressor Co.

5304 Harvard Avenue
CLEVELAND, O.



Two Stage

Usaco
AIR COMPRESSORS

Single Stage



Educating the Tourist

The Summer Service Number of MOTOR AGE will reach you next week. In that number the editorial department will undertake to suggest many ways for making the touring business more profitable to the dealer. At the same time, we believe that we are going to make touring more pleasant and economical for the car owner and we are going to depend upon our dealer-readers to pass on this message to their car-owner customers.

Most touring disasters and unpleasantness are due to a lack of proper preparation by the car owner. The car owner is a host, probably 11,000,000 strong. The best way to carry a message to this great army is through the dealers. And so we are going to ask the dealers of this country—vehicle, maintenance, equipment, and tire dealers—to join in carrying the message of preparedness to this great army of car owners. It probably is the greatest host of people who have ever expressed, with considerable cash, their interest in one particular thing, in this instance, car ownership.

Our ideas are that proper touring should be encouraged. More touring means many things, and one of these things is a greater appreciation of the automobile. Greater appreciation of the automobile means more cars, more use of cars, more maintenance and MORE PROFITS for the dealers all along the line.

The promotion of touring is up to the dealers. If they will give the tourist good advice, honest workmanship and prices, everybody will be happy. If the old spirit that the tourist is a "good thing" and legitimate prey for gouging, prevails, everybody will lose money and car owners generally will see "red". The coming touring season offers a splendid opportunity for the industry to put itself in a better position with the car owner. We are going to try and do our part.

Nash Leads the World in Motor Car Value

NASH— A Great Growth and a Desirable Franchise

During the first six months of our contract year (September 1, 1922 to February 28, 1923) Nash Motors shipped to the forty Nash sales districts in the United States 196% more cars than during the same period of 1921-1922.

The largest shipment increase recorded by any sales district touched the high mark of 544%.

The lowest gain tabulated was 43%.

Fourteen districts registered gains of 200% or better.

Thirty districts made advances of 100% or above.

Here is undeniable evidence of the great growth in the demand for Nash cars.

And it is an equally significant indication as to the growth in dollars and cents of the value of the Nash franchise.

If you want a growing and profitable business write us about some good territory we'll close shortly.

NASH

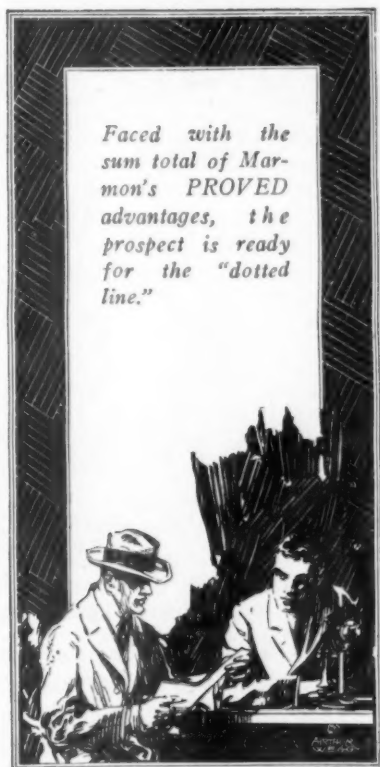
THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

Nash Leads the World in Motor Car Value

The New Day In Car Merchandising

"Marmon methods" have revolutionized not only fine car production, but fine car selling as well.

Just as new-day practices have produced a fine car capable of serving its owners at a far lower cost than many a smaller, cheaper car, so have they created a new merchandising structure capable of yielding steadier sales and higher profits at lower selling and service costs.



A wonderful car has been mated to a wonderful selling policy—with results that have become notable.

A Marmon dealer's investments in selling are highly productive. His investment in service is very small. His profits from sales go to pay dividends, not to satisfy insistent demands for repairs and adjustments.

Hence he prospers. No insoluble sales and service problems confront him. He takes no step in the dark. Speculation forms no part of his business. He does nothing by guesswork. For working with him at every stage is the Marmon Sales Extension Division—authors of the new-day method in motor car merchandising.

They bring success to all who seek their help. Wouldn't you like to have it? Know their method, and why it is unfailing in results. An inquiry will bring the details. Write today.

NORDYKE & MARMON COMPANY

Established 1851

INDIANAPOLIS

Address Inquiries to Dept. A.

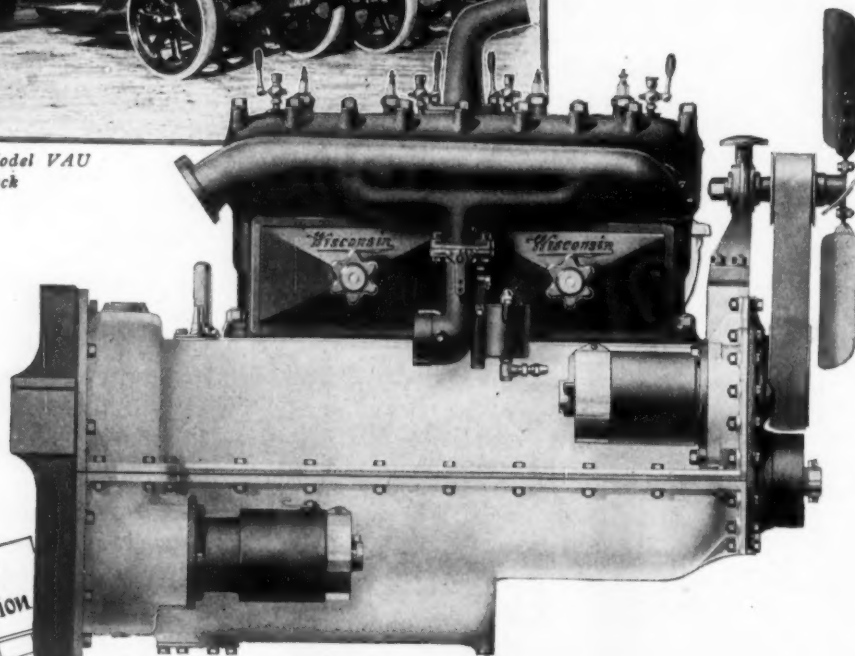
MARMON

The Foremost Fine Car

This is the thirty-eighth of a series of fifty-two advertisements appearing in this publication



Wisconsin Motor Model VAU
in Maccar Truck



COST SHEET
Maintenance and Operation

Offices in New York,
Cleveland, Chicago,
Los Angeles, Seattle.

Bring Down Operating Costs

You can sell the truck that has a Wisconsin motor on the operation and maintenance cost sheets of users.

These are the figures that are the *most* interesting to your "prospect" because the cost of keeping a truck running is the real basis of its value to him.

Wisconsin motors are designed by practical engineers who never forget the value of accessibility and standard construction.

They weigh less per horsepower resulting in lighter vehicles that make greater pay loads possible.

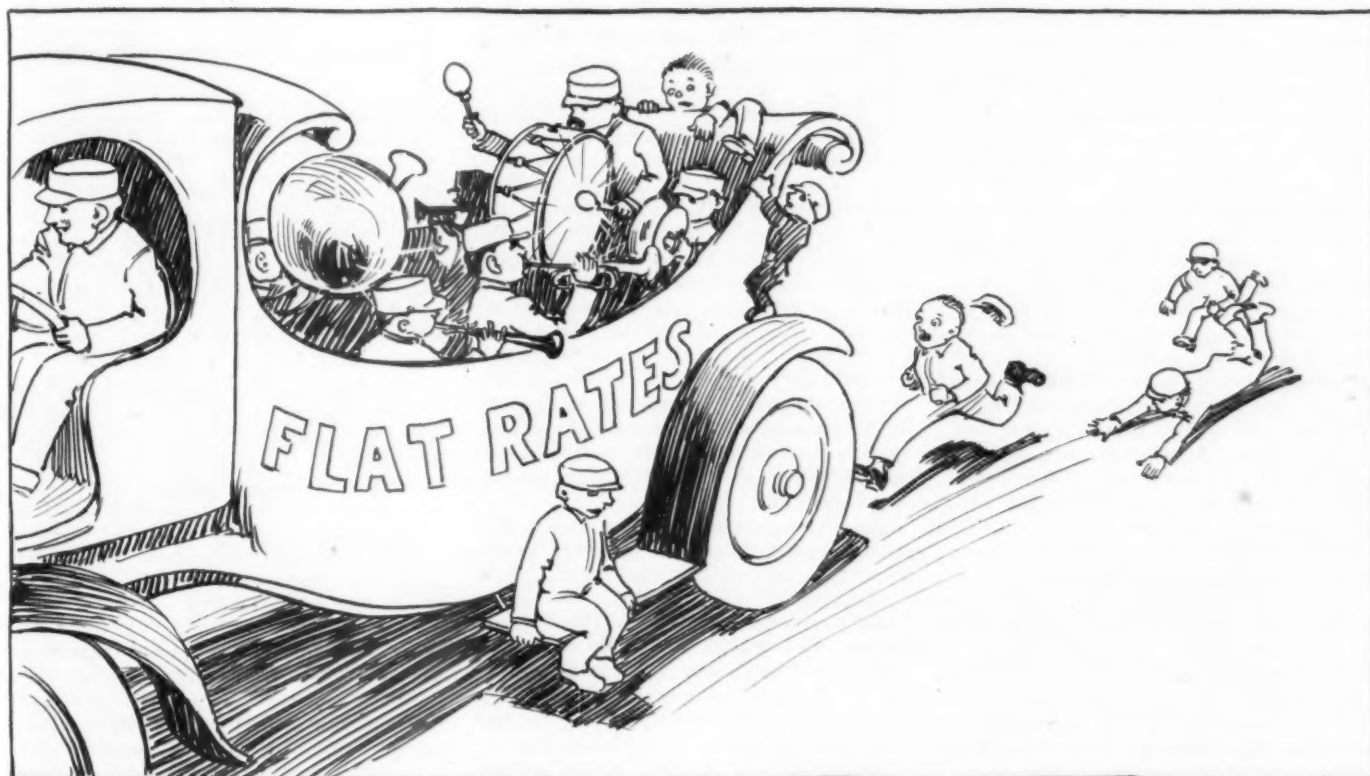
A complete and efficient service department at factory and branches.

WISCONSIN MOTOR MFG. CO.
MILWAUKEE, WISCONSIN

Wisconsin

CONSISTENT

MOTOR AGE



In every section of the country dealers and those selling automotive maintenance are hustling to get on the flat rate band wagon. In many cases the factory devises the flat rate operations and suggestions and then literally speaking, drives its band wagon of flat rate amongst its distributors and dealers, urging them to climb on that they might sell their service and maintenance on better basis

Maxwell Flat Rate System Designed to Merchandise Maintenance

System Is Sufficiently Simple For Organization Which Has Had No Previous Experience With Flat Rates. Arranged So Service Department Has at All Times Knowledge of the Cost and Working Details of Business

By J. EDWARD SCHIPPER

A FLAT rate system has been worked out by the Maxwell company and put in the hands of its dealers. The system includes a complete schedule of operations with the time required for each, as well as shop forms and blanks, information covering special service tools, parts storage and inventory and an accounting system. The system is designed to be sufficiently simple for an organization which has had no experience in flat rates, or even automobile servicing, to gain by a careful perusal of the factory instructions,

a good working knowledge of how to operate the system.

In working out the flat rate system, the sales department which has the service work in charge has tried to inject a spirit of good will into the system. It is designed not only to merchandise the service, but also to hold old Maxwell customers and to gain new ones. The theory behind the system has been to consider the car owner as the company's chief salesman. It is believed that the message the car owner delivers to his

friends will be governed very largely by the service he receives. The flat rate system has been designed to make this message a favorable one. At the same time, it enables the service station to make a profit on the work. It is arranged so the service department has at all times a thorough knowledge of the cost and working details of the business.

The forms cover not only the orders for repairs and the handling of the repairs through the shop, but also mechanics' compensation, parts department, perpetual inventory stock records and special courtesy extended to the owner. These forms tie together the shop, parts and accounting departments in such a manner as to minimize clerical help and promote the maximum efficiency. The flat rates have been worked out as a result of time studies at the factory, compared with actual experiences in the service stations. Each operation has been checked by these methods and the time fixed by a committee which had all of the evidence at its disposal. The times are furnished to the dealers by the Maxwell Motor Sales Corp. and the flat rate book is so arranged that the dealer can fill in the actual dollar and cent price of each job from the time, basing his prices on the labor market in his own locality. Once the hours and minutes have been converted into dollars and cents, the latter figure alone is used and not the time period.

The operations are divided into thirty groups arranged alphabetically. Each group is split into component units and the flat rate book is completely indexed so that it is simple to find any of the operations. The operations which fall logically into the flat rate system are given by number, then a description of the operation, following which the time required for it is indicated with a blank space for the dealer to fill in the amount, which, as stated, takes the place of the time figures after the system is installed.

A few operations have the word "contract" printed after them in place of the flat rate charge. If work of this nature is done by outside firms, which make a specialty of it, it is possible to have a contract made with them to handle specific jobs at fixed prices so that the charges can be entered on the flat rate schedule. If this class of work is handled in the dealer's own shop, the foreman can estimate the labor required and make an estimate charge to the customer, if desired. Examples of contract work include such items as straightening bent sheet metal work, painting and welding. Since no two jobs are alike, it is impossible to fix a flat rate on them.

Only a Few Time Operations

In a very few isolated instances there are certain operations which are denoted in the system as "time." In these cases it is necessary to have the men do the work on a time basis and charge at the regular rate per hour. A typical time operation is the lining up of a fan pulley. Another typical operation would be cleaning the spots out of upholstery. The dealers are instructed to guarantee the work in connection with the flat rate system in order to inspire confidence in the organization. The only exceptions are operations which are noted in the installation book which obviously cannot be guaranteed.

The flat rate lists for the men in the shop are printed on what is known as the heavy-duty, shop, flat rate book. This is an especially sturdy book with celluloid pockets which hold the paper pages. The covers are made of a flexible, heavy-duty material and the book can be thumbed at will without danger of destroying its legibility. It may be secured by a chain, to prevent loss or misplacement, in the part of the service station where it is most used.

One of the points which have been taken into consideration in designing the system is to relieve the service sales-

Form 2555

MECHANIC'S RECOMMENDATION

Repair Order No. _____

I recommend the following additional work for this car.

Mechanic's Name _____
Foreman's Approval _____

Owner notified by ☐ Authorized. Yes ☐ No ☐

Date _____ M. _____ 192____

Form 2555

Should a mechanic find any additional work necessary on a job he makes out his recommendation and hands it to the foreman

man to as great a degree as possible of the danger of costly, false diagnosis. While it is necessary that the service salesman be a man who is thoroughly acquainted with the car and able to diagnose trouble, the system is designed, where possible, to leave him a loop-hole in case of a baffling trouble.

For example, if an engine is brought in with a peculiar knock, it is not necessary to guess at the cause of the knock. An operation is provided which covers the labor necessary to find almost any engine knock. This operation includes removing the cylinder head and oil pan, removing carbon, remove and caliper pistons and cylinder walls to check fit, check rod bearings and camshaft bearings and check end play in camshaft. It is quoted at 5 hr. This operation covers the labor necessary to locate any trouble and, if further work is necessary, the shop can call the owner and explain the situation to him. It is then possible to add without guess work, the proper operations for eliminating the cause of noise.

It will be noted that this procedure is in keeping with the thought expressed under item 5 on page 10 of the March 15, issue of MOTOR AGE, in which appeared an article on the installation of the flat rate system. This item read as follows:

"5—You cannot always give to the customer the exact cost of a job, because that job may necessitate a complete tear down of an engine or other unit before an inspection can be made and the job properly diagnosed. But, all the operations involved in the tear down, inspection, repair and re-assembly will be on hand and before the job is started the customer can be told the nature of the job and the exact cost."

Standard Set of Forms Prepared

In the actual operation of the system a standard set of forms has been prepared. The first of these is called the authority for repairs. It is in duplicate and on it is noted the work to be done, the operation numbers and the prices. This form is signed by the customer who retains the duplicate. The original is sent to the office, where the repair order is written from it.

The repair order is written on the

Form 2563

BLANK MOTOR CO.

22 MAIN STREET
DOEVILLE, MICH.

AUTHORITY FOR REPAIRS

Foreman will give name and number of mechanic who will execute these repairs.

Name _____
No. _____

Date _____ Phone No. _____ Office _____ Rep. Ord. No. _____
Owner (Print) _____ Res. _____ Wanted _____

Address _____ License No. _____ Mileage _____ Motor No. _____
Where else readily reached _____ Car No. Maxwell ☐ Chalmers ☐ Body Type _____

Operation Number _____ INSTRUCTIONS _____ Labor Charge _____

I AUTHORIZE ABOVE REPAIRS, UNDER THE CONDITIONS PRINTED BELOW, AND IN ADDITION, ANY OTHER MINOR REPAIRS FOUND NECESSARY. Signed _____

TERMS: We have avoided burdening our customers with costly collection and bookkeeping expenses; thus our charges are on a minimum basis and our terms strictly cash upon completion of work.

STORAGE: A daily storage charge is made, commencing 48 hours after notification that repairs have been completed.

FIRE AND THEFT: While every precaution is taken, we assume no responsibility for owners' cars or contents, either in whole or in part. Check your valuables in our stock room.

This is the form signed by the car owner and which gives the necessary authority to go ahead on the job

typewriter in triplicate, conforming exactly to the wording of the flat rate book for the operations specified on the "Authority for Repairs." The blue copy of this form is returned to the shop where it is turned over to the mechanic assigned the work. It furnishes him with instructions for the work to be done and also acts as an order on the stock room for parts. If any operation is charged on time, the net time is listed in the space provided on the back of the order. The blue copy is returned to the office with the foreman's signature and approval upon completion of the work. The yellow copy of the repair order is sent to the stock room. All parts issued on the repair order must be entered on the back of the yellow copy and the mechanic should receipt each item in the space provided. As the parts salesman is usually the man authorized to issue purchase orders, it is convenient to enter orders for outside work in the space provided on the back of this copy. There is also space for noting any material returned for credit. Upon completion of the work, this yellow copy serves as the office record of the transaction.

The white copy of the repair order is retained in the office. Upon completion of the work, an itemized account of the transaction is made on this copy and it is presented to the customer as his invoice.

Mechanic Makes Recommendations

A form is provided, known as the "Mechanic's Recommendation," in case a man in the shop should notice any additional work which is necessary. The recommendation is given to the foreman, who will see that the customer is notified as quickly as possible. If he approves this additional work, the operations are listed on all copies of the repair order at once. The recommendation, with its notation of approval or disapproval, is filed with the blue copy of the repair order for further reference. A supply of these blanks is kept in the shop where the men have easy access to them.

Record of the mechanic's labors and the time required on the operation is kept on the daily operation ticket. It also acts as the mechanic's clock card. There are spaces provided near the bottom of the card for ringing the clock in and out at the beginning and end of the day and at noon. In addition, the card is rung in the column headed "time started" at the beginning of each operation. When the operation has been completed the card is rung out in the column headed "time finished." Repair order, number and operation are noted in columns provided. The net time less deductions for lunch, etc., is noted in the column headed, "net time" and the amount of the mechanic's earnings is placed in the column so headed.

Foreman Gets Mechanic's Card

If the mechanic is paid on a time basis for the operation, the word "time" is written in the right hand column and if on a piece-work basis, the letters "p. w."

are put there. This card is handed to the foreman at the close of the day along with all blue copies of the repair order that the mechanics may have at the time. When the card is checked against blue repair orders the foreman signs the card and sends it to the office where it is used for making up the pay roll.

Assuming that a car owner drives into the service station to have the valves ground, the way the system works is as follows: On the authority for repairs form, the date, name and address of the customer, telephone number, etc. are written. The license, car number and speedometer readings are noted. The operation number and labor charge as denoted in the flat rate book are then entered on the authority for repairs form. The customer is asked to sign the form and he is given the duplicate copy. At the same time, it is explained that the amount of the charge is for labor only and that all parts necessary will be charged for as used. Right care is exercised in this so that disputes afterwards will be eliminated.

Original Order Typewritten

The original of the authority for repairs is sent to the office and the repair order written from it on the typewriter. The description of the work is copied exactly as it is written in the flat rate book. When the repair order has been written, the authority for repairs form is put on file until the customer has accepted the car and paid the charges. At this time it may be destroyed or filed with the executed repair order. The various copies of the repair order are dis-

tributed as explained. The mechanic assigned to the work rings his daily operation ticket in the column marked, "time started" and writes the operation number and repair order number in their proper places. He then clips the order on a clip board and hangs the board on a hook designed for the purpose. The foreman, for his own convenience in checking his shop, appoints a place where each man keeps his clip board.

Assuming that the man finds he needs two new valves for the job, he writes this in the proper place on the back of the order, has it approved by the foreman and takes the order, with the old valves, to the stock-room. The man in the stock-room copies the order on the back of the yellow copy, entering the part number and price, and delivers the valves to the mechanic having them assigned to him. Broken or worn parts are always returned to the stock-room before new parts are issued.

Assume at this point that the mechanic discovers that the radiator has a small leak which should have attention. He writes this down on the mechanic's recommendation and hands it to the foreman. The foreman examines the radiator and estimates the charge for repairs. This is one of the isolated cases where a flat rate is not practical. He then, gets in touch with the owner and tells him of the condition and how much it will cost to repair it. We will assume that the customer authorizes the work. The three copies of the repair order are returned to the office and the operations for removal, installation and repairing of radiator are put on each copy.

A copy of the repair order form which has been evolved by the Maxwell Motor Sales Corp. for use with its flat rate system for dealers. It is made in triplicate, one copy going to the customer, the second to the stock room and the original to the shop

When all the work has been completed, the mechanic, after placing his number before each of the operations, which he performed, and after noting any time labor to be charged in the space provided, gives the blue copy to the foreman. After satisfying himself, either by personal examination or through an inspector that the work has been properly done and that the charges for time are proper, the foreman signs the blue copy and sends it to the office. The yellow copy is obtained from the stock-room and the two are made similar and then totaled. The white copy is then made to conform exactly with the others. The blue copy may now be placed in a file arranged alphabetically according to owner's names.

Customer Gets White Copy

The white and yellow copies are held on file until the customer calls for his bill. When he arrives, he signs the yellow copy in the space marked, "received by." After payment is received, the customer is given the white copy, receipted. The clerk makes entries at the bottom of the yellow ticket, the date and hour of delivery, and the name of the person who released the car. The yellow copy is then placed on file of daily cash sales. At the close of the day the yellow copies are sent to the main office along with the cash receipts. After these have been checked, the yellow repair orders are returned to the stock-room where the parts listed thereon are deducted from the perpetual inventory cards and the costs are entered opposite each item. They are next checked against the daily operation tickets and finally the transactions are entered in the daily sales summary book. The yellow copies are then filed numerically according to the repair order numbers.

This is the mechanical operation of the system. Beyond this, the shop is instructed to give rigid inspection and to see that no grease or dirt is left on the steering wheel, brakes or gearshift lever, floors, seats or any other part of the car with which the mechanic has come in contact. It is recommended that a little extra service such as cleaning up windshield and disk wheels, and brushing off the floor and cushions be provided in order to establish good will. Before the car is delivered, a stamped return postcard for the owner to fill out is attached to the steering wheel.

What Cards Accomplish

These cards accomplish three purposes. 1—They indicate to the customer that the service station is anxious to do the work properly. 2—They provide an opportunity for the shop to correct any mistakes and, consequently, to eliminate the dissatisfied customer. 3—They provide very excellent material for the car salesman, who can be equipped with a number of these cards.

The Maxwell company recommends that where the volume of repairs is sufficient to keep a mechanic steadily employed that the straight, piece-work sys-

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I am entirely satisfied with the work done on my car on this occasion ☐

I am not entirely satisfied with the work done on my car on this occasion ☐

Remarks _____

Repair Order No. _____ Signed _____

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M _____

Recognizing the fact that our new car sales will grow in exact proportion to the good will earned by our Service department, we have bent every effort toward making the workmanship which has gone into the repair of this car, a matter of conscience rather than of profit.

We ask you therefore, to mail attached stamped addressed postal card within the next 48 hours so that we may know definitely how well we have succeeded in accomplishing our object.

BLANK MOTOR CO.
22 Main Street

The return postal card attached to the steering wheel of a car and to be filled out by the customer

tem be used. Under this plan it has been found fair and equitable to pay the mechanic 40 per cent of the flat rate charge for the operations performed. In order to maintain a high workmanship standard, each mechanic must guarantee his work or do it over again without pay. In connection with the flat rate system, the Maxwell company has worked out a standardized parts department calling for suitable bins which have been especially developed for Maxwell dealers, adequate parts stock, perpetual card inventory and minimum transportation cost.

The perpetual inventory forms follow conventional practice for this sort of work. To secure the minimum transportation cost, it is recommended that the dealers keep a check on their supplies long enough ahead so that they will be able to order new parts by freight instead of express or parcel post. The Maxwell company has also developed a list of tools especially designed for repairing Maxwell motor cars. A list of Maxwell service tools has been made up and these are handled by the Miller Tool & Mfg. Co., of Detroit.

Owners Should Be Quickly Informed

In instructing its dealers on the methods to use in putting in this flat rate service system, the Maxwell Motor Sales

Corp. advises that the owners should be quickly acquainted with the fact that the system is in operation. A special announcement folder which tells of the installation of the system in a manner intended to interest the owners has been prepared by the company. It also advises that the shop be run on a cash basis and has printed on the authority for repair blanks the following: "We refuse to burden our customers with bookkeeping and collection costs, therefore, all repairs and parts are strictly cash."

Columbus Trade Association Reorganized Under New Plan

COLUMBUS, March 26—The Columbus Automobile Trade Association has been reorganized. The initial membership of the new organization is 45 and increases are received daily. Albert I. Fishbaugh was elected president; A. C. Mundew, vice-president; R. C. Mackenzie, secretary, and Lee Hays, treasurer. These officers, with several other members, constitute the board of directors. An open meeting was held at the Southern Hotel recently when E. B. Gallaher, editor of Culver Service of New York, was the principal speaker on "Prospects for 1923 in the Automotive Business."

Bullard Carburetor Imparts Large Amount of Heat to Insure Complete Vaporization of Present Grades of Fuel

THE most recent addition to the carburetor field is the Bullard, the underlying principle of which is to supply a great amount of heat to insure complete vaporization of the modern heavy grades of fuel. Probably the most striking feature of the carburetor is the spraying of the fuel by the exhaust gases, no air coming into contact with the mixture until after it has passed through what might be termed the vaporizer portion of the carburetor.

Referring to the longitudinal sectional view, the mixture is produced at the left side by a small amount of the exhaust gases blowing by the fuel nozzle. This mixture of sprayed fuel and hot spent gases is then carried through a vaporizing chamber in the form of a letter S, through which extend twenty vertical heating tubes.

This vaporizing chamber is completely surrounded by an exhaust jacket, the exhaust gases entering at the top, passing around both sides and leaving at the bottom through a muffler. The sides of the vaporizing chamber are cast with flanges extending into the heating jacket, so as to increase the absorption of heat.

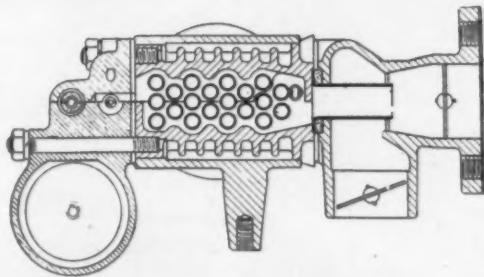
As the mixture leaves the vaporizer it passes through a short central injector tube, and air enters the carburetor around this tube. Just beyond this tube is located the throttle valve. There is a strangling valve in the air inlet which is interconnected with the throttle valve in such a manner that it remains fully open as long as the throttle is not more than half closed, so that the power of the engine is not interfered with.

When the throttle is more than half closed, and, as a result, the suction effect in the carburetor drops considerably, this valve is progressively closed, so as to keep up the depression.

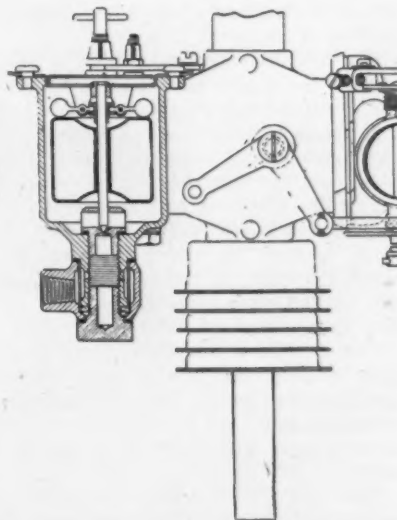
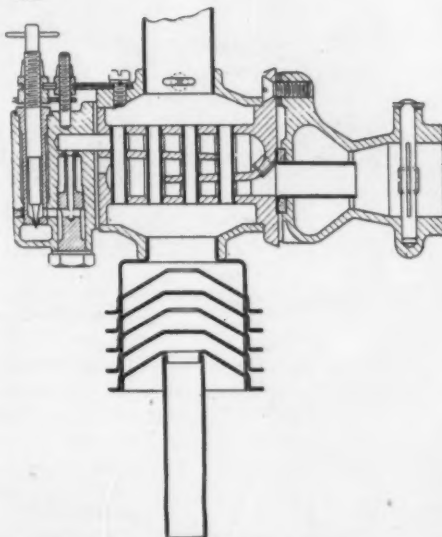
The metering orifice of the carburetor is adjustable by means of a needle valve. Referring to the longitudinal section, fuel from the float chamber enters the open space seen at the left hand side at the bottom. It then passes by the needle valve and through a sort of nozzle located adjacent to the needle valve, at the top of which it enters the vaporizing chamber.

At the bottom of the nozzle the exhaust gases enter through a branch from the exhaust manifold. At the end of the first section of the vaporizer there is a drain hole, and any unvaporized fuel which may collect on the wall of the vaporizer at the turn may drain off through this hole into the injector tube.

From the above description it will be seen that with this system the fuel in the first place mixes only with hot exhaust gases, of which a comparatively small quantity is used. These gases, coming directly from the exhaust manifold, are under considerable pressure, depending upon the load on the engine, and the spraying effect therefore is prob-



Sectional views of the Bullard carburetor. There is a strangling valve in the air inlet interconnected with the throttle so that it remains open as long as the throttle is not more than half closed, thus not interfering with the engine power



ably considerable more energetic than in an ordinary carburetor. Only this mixture of fuel and spent gases is heated in the vaporizer, while all of the air is admitted to the inlet manifold without heating, hence the volumetric efficiency under full engine load should be high.

This carburetor has been developed for installation on Ford cars, and some tests made on the chassis dynamometer at the mechanical engineering laboratory of Sheffield Scientific School showed a

fuel consumption of 1 gal. to 30.5 miles for a Ford sedan under the most favorable conditions, that is at a test speed of 10 m.p.h. At 20 m.p.h. the efficiency was practically the same, the mileage on 1 gal. of fuel being 30.2.

The carburetor is the product of the Bullard Machine Tool Co., Bridgeport, Conn. It is not the intention of the company to confine itself to the replacement field, but it will also make the carburetor for manufacturer's equipment.

23 Years Ago This Week In Motor Age

The Kaiser Knows Now

Figaro publishes a sensational item recently to the effect that the German Kaiser has offered a prize of 80,000 marks, or \$20,000 (Not now!), for the best war automobile. Experiments conducted for some time past have shown such satisfactory results that they induced the kaiser to offer the prize, thus showing what importance he thinks the motor vehicle will play in future wars.

On Boston's Motor Row

BOSTON, March 25 (1900)—Kenneth A. Skinner, by the way, has just opened a new depot at 268 Massachusetts avenue, which is already the "motor row" of Boston, and will sell and rent Orient machines fitted with de Dion motors. Charles S. Henshaw, of motor pacing fame, is associated with him. He has one of the best locations on the "row," close to the extensive park system, and should do a gilt-edged business.

Whitney and Stanley Join Forces

BOSTON, March 25—It will surprise many people who have thought themselves familiar with the motor industry to learn that George E. Whitney, one of the first steam carriage men in the east, has joined forces with the Stanley brothers of Newton, and that the trio are working together toward a common end. Mr. Whitney spends much of his time at Newton and, while it has been said that the Stanley carriage was not protected in part by patents, Mr. Whitney is authority for the statement that they are using some of his patented devices.

Brief News Items

Chairman Batchelder is laboring upon the rules of the season for motorcycle (that's the way they spelled it then) and automobile track contests. He has a number of bright minds at work but does not believe it will be possible to cover quite all contingencies in the first rules.

Car and Truck Announcements

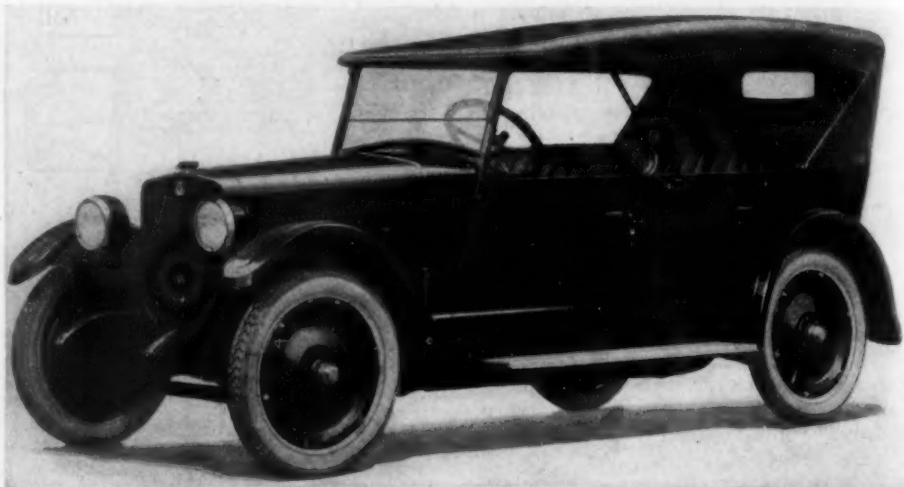
Columbia Has New Touring Body

THE Columbia Motor Car Co. increased its price from \$40 to \$75 and has placed on the market a new touring model to sell at \$1095. The price on the coupe has been increased from \$1235 to \$1295; on the sedan from \$1395 to \$1465 and on the phaeton \$1095 to \$1135. The price of the standard, four-passenger touring remains at \$985.

The new touring body which is mounted on the light six chassis with the 6-Y Continental engine is an all-steel unit made by the Mullins Body Co. It has black baked enamel finish. It differs from the previous standard touring car in that the rear seat has been widened from 43 in. to 46 in., the extra space being gained by using a deep wheel housing, whereas the standard touring car has no wheel housing at all. It is also longer and of different contour.

The car is a low hung, straight line type without top bows. The body has considerable length for the wheelbase, providing more leg room. This has been secured by a long overhang over the rear axle.

There have been some chassis modifications, particularly in the final drive. The Continental 6-Y engine remains prac-



New full five-passenger open car selling for \$1095, mounted on the standard Columbia six-cylinder chassis with 6-Y Continental engine

tically unchanged, one small alteration having been made from an accessibility standpoint. This consists of putting a cover over the timing gear case so as to enable the timing chains to be held, in case of operation on the generator drive. Formerly, the timing case was solid and the chain was inaccessible from the front end. The axles have been changed, the

rear now being the Timken 5014, which has a four pinion differential instead of the two pinion formerly employed, and 14 in. brake drums. The gear ratio is now 5 1/10 to 1 instead of 4 5/11 to 1. The front axle is the Timken No. 1010 and now has ball and socket construction on the steering cross-arm instead of yokes.

Davis Adds a Five-Passenger Brougham

THE George W. Davis Motor Car Co. announces a new brougham finished in a rich, deep maroon, with fenders, chassis and upper body panels in black enamel. The nicked radiator, aluminum steps and the polished aluminum luggage rods on the rear body panel afford a note of contrast which sets off the body color to its best advantage. A spare tire and Distel wheel are carried

at the side, and a trunk is mounted at the rear. The body contains ample room for five passengers.

The interior is upholstered in heavy brocade beaver brown velour. The doors are 28 in. wide. Front seats tilt forward to facilitate entrance to the rear seat. Windows are raised and lowered by crank window-lifts. Equipment includes cowl ventilator and motometer.

The chassis of the brougham is the same used in all the Davis Series 70 models. It is powered with the Con-

tinental Red Seal 6-Y engine and has a wheelbase of 115 in. Delco electrical system, Timken axles and bearings, Borg & Beck clutch are standard in this, as in all Davis models. The price of the brougham is \$1595 at the factory.

Diamond T Truck

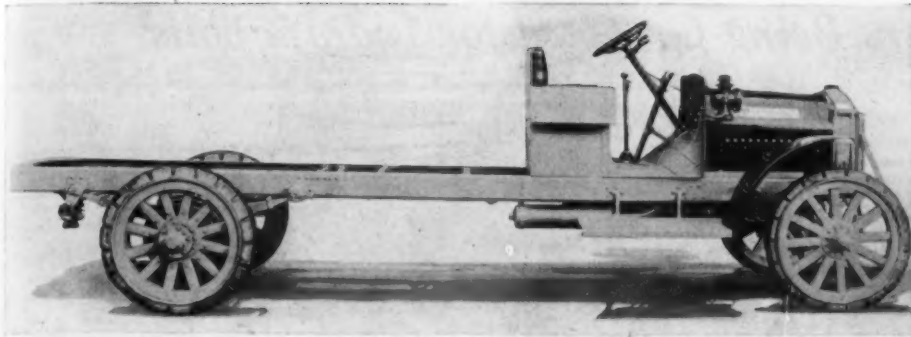
A NEW 2½ ton truck designated as model U2 has been announced by the Diamond T Motor Car Company. The chassis weight of the new model is 5,250 lbs. A body allowance of 1500 lbs. with the load of 5,000 lbs. gives the road weight as 11,750 lbs. The standard wheelbases are 144 in. and 160 in., with 170 and 180 in. optional at small extra cost. The frame length back of the seat is 123¼ in. and 132 in. respectively for the standard wheelbases. The recommended road speed on solid tires is 16 miles per hour. Higher speeds on pneumatics can be had if desired.

Model U2 is equipped with a Hinkley engine, having a bore and stroke of 4½ by 5¼ in. with a rated horsepower of 25.6. The valves are on the right side and accessible because of the two detachable heads. As in all other Diamond T models lubrication is by forced feed to all the bearings. The Alemite system and grease cups are used for chassis lubrication.

The new model embodies other well known units, including Timken axles,



Davis Brougham, model 76, which sells for \$1595 at the factory. The car is finished in deep maroon and black and uses the same chassis as the series 70



Gemmer steering gear, A. O. Smith frame, Spicer & Thermoid Hardy universal joints, Bosch magneto and Stromberg carbureter.

The frame of the new model has been enlarged and strengthened not only by larger dimensions but with a new type of cross members which lie flushed with the frame side rails and are heavily gusseted. The springs are wider than on the former 2½ ton truck and longer. The spring hangers also are larger and neater in design. An increase in bearing service for the spring bolt is an important feature.

The Schacht 1½ Ton Truck

A NEW 1½ ton truck known as the Light Weight Champion has been added to the line of The G. A. Schacht Motor Truck Company. Some of its outstanding features are an overhead valve engine delivering 50 hp. at 2000 r.p.m., disc clutch, four speed transmission and a double reduction rear axle. The bore and stroke of the engine is 4 by 5 in. and the engine has a removable cylinder head, forced feed lubrication is used with direct oil leads to the rocker arms. The motor pump is of the centrifugal type. The carburetor is a Zenith and ignition is by magneto. The governed speed of the truck is 25 m.p.h. and the chassis weight is 4500 lbs.

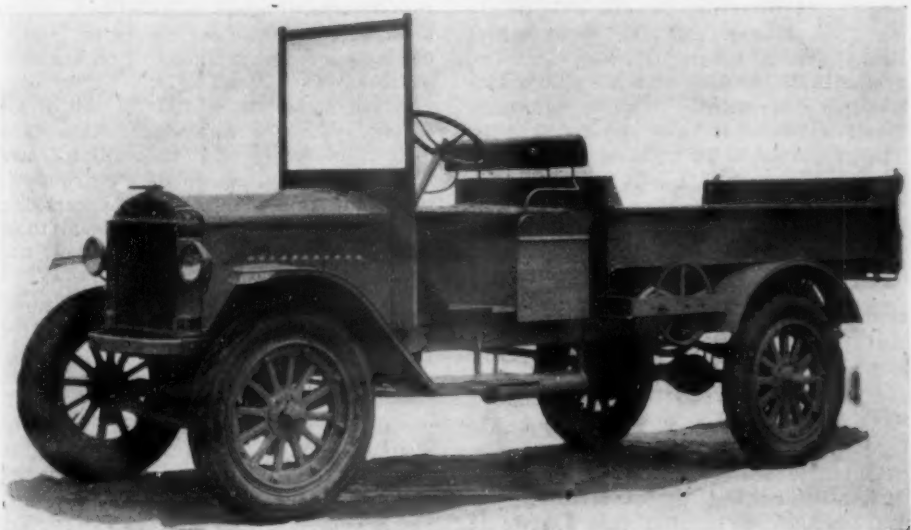
The wheelbase is 144 in., suitable for a 10 ft. body. A longer wheelbase can be supplied, being 164 in. with a 12 ft. body space. Wheels are of the artillery type and fitted with solid tires the front being 36 x 3½ and the rear 36 x 7 in. Pneumatic cord tires can be furnished at extra cost. Both sets of brakes are mounted on the rear wheels. Two propeller shafts and three universal joints are used, the center joint being supported

on S. K. F. self-aligning bearing. The drive is taken through heavy ball jointed radius rods. Standard equipment includes two cushions, two side and one

tail oil burning lamps, horn, jack and necessary tools. Electric lights, generator and starter can be furnished with extra cost.



Avery Motor Truck with Dump Body Equipment

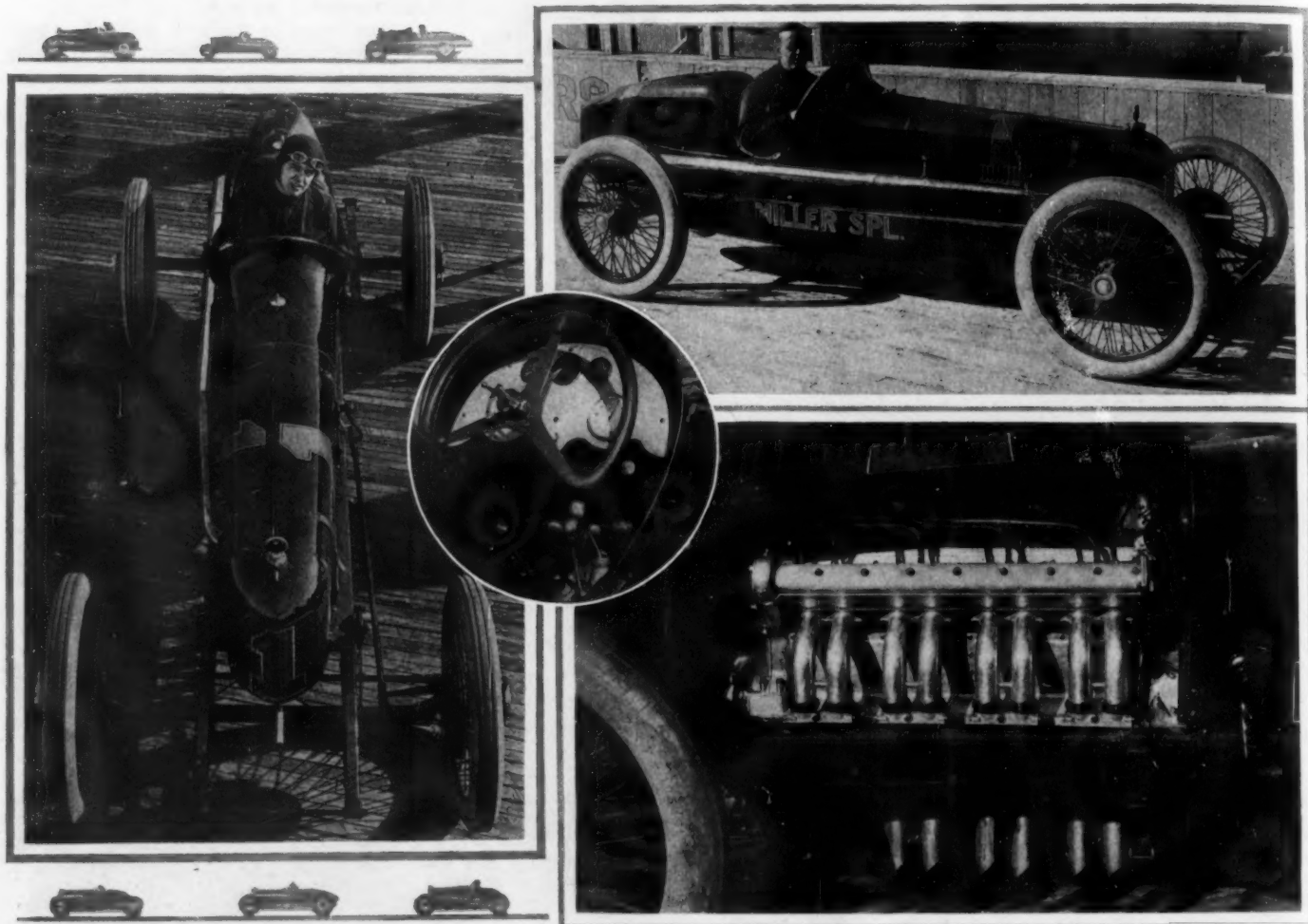


THE Avery motor truck, equipped with the Heil dump body, is especially built for utility work, being adapted to road maintenance, general contracting and construction of all kinds. The hoist will lift a 3000 lb. load to a 45 deg. dumping angle with 15 turns of the crank by applying 30 lbs. of pressure to the crank. The hoist can be locked so that only part of the load need be dumped at one time.

The body length is 7 ft., width is 4 ft., height of lower sides is 12 in., capacity, 28 cu. ft., upper sides, 8 in. capacity 42 cu. ft.

The body is tapered, being 3 ft. 11½ in. at the front and 4 ft. 1½ in. at the rear. The height of mounting from the sill to the bottom of body is 9 in. Twelve gage steel is used throughout. The disc and pinion gears are cut to mesh properly with least friction. The tail gate is double acting with a special adjustable feature.

Miller Race Cars Being Groomed for Indianapolis



Here are some close-ups of Tom Milton's 122-in. Miller Special which he will drive in the coming Indianapolis 500-mile race. The lower part of the steering wheel has been omitted to allow clearance. There are four duplex carburetors supplying the eight cylinders.

THE new 122 cubic inch engines and racing cars being built in Los Angeles, Cal., in the shops of Harry Miller are kept shrouded in secrecy. Only such superficial details as are apparent are revealed with the exception of a few dimensions.

Miller now has under construction six of these miniature racers. Tommy Milton's is built and already is receiving speed tests. Four of the cars will be for the Durant team and the sixth is for Frank Elliott. On the Beverly Hills Speedway Milton's car has shown 112 m.p.h. and Milton says he does not know how much more speed will be possible.

The baby race cars Miller is building will offer as little wind resistance as can be brought about and yet mount a body on the chassis. It is 720 square inches as against 874 square inches of the 183 cubic inch mounts. The cars weigh but 1353 lbs. Lack of weight has been accomplished in many ways. The cars will have room for the driver only. The eight cylinder engine weighs 303 lbs. The springs weigh 12 lbs. and the entire rear end assembly without the gears weighs 69 lbs. There is no lower segment to the steering wheel, in order to make

room for the driver's legs. The driver will straddle the steering column. The hand brake and gear lever are in the middle and there are no floor boards.

The wheelbase is 100 in. and the tread 52 in. The body is but 18 in. wide. The maximum engine speed is from 4500 to 5000 revolutions per minute. There are no rear brakes and the front wheel brake drums weigh but 6¼ lbs. The frame is 21 in. wide and the sills a single piece of metal. Gasoline consumption is expected to be so reduced that the tank capacity is 26 gallons.

Cliff Durant has announced that following the Indianapolis race he intends to send his four man team to Europe to compete in the International Grand Prix.

The Dodge Flat Rate Book

The Dodge Bros. flat rate book has now been completed and is being distributed to dealers and service stations. Primarily worked up to facilitate the introduction of the flat rate system in Dodge Bros. service stations, the addi-

tional matter included in the book makes it really a general shop reference book. There are a total of 310 pages, loose leaf form, in an imitation leather cover, size 5¼x8¼.

The first part of the book is devoted to a thorough explanation of the flat rate system which is followed by a statement of the Dodge service policy and a discussion of the methods of paying mechanics. The layout of the parts room receives some space and is well illustrated. The recommended standard forms, invoices and requisitions are reproduced and complete instructions given for filling them in and carrying on the system. All Dodge special tools are listed, giving the parts number, use and price.

Another very helpful section is a number of selections of machine tools for shops of various sizes.

The main part of the book, however, is devoted to a complete flat rate schedule giving not only the operations but also the number of hours required, the maximum amount of parts needed in the operation with the prices of each part and a complete step by step instruction for performing the operation.

Importance of Maintenance to the Industry

How to Develop It by Cooperation of Service Personnel

By B. B. BACHMANN

(Address by B. B. Bachmann, past president of the Society of Automotive Engineer and Engineer of the Autocar Co., before the recent N. A. C. C. Factory Service Managers' Convention.)

DURING the last quarter century, which covers the inception and growth of the automotive industry, there have been many and remarkable changes in the world of commerce. This period covers the time when intense agitation against the accumulation of financial and industrial power in the hands of a few individuals has brought out the fact that a successful business, compatible with the public welfare, must not only be law-abiding, but must also possess a high sense of responsibility and that quality which we call character.

In the beginning of our industry, founded as it was on the invention of a new device, the individual occupied a most conspicuous place. This was a phase that passed rapidly, but during this period and for some time after, we see this individualism strongly emphasized. Sales appeal was first based on novelty and the sporting instinct as it reacted to the speed possibilities; following this, the matter of luxury of appearance and appointment, and finally, the question of transportation facility.

Developments in design and methods of production are not sufficient in themselves, however, to make it possible for the automobile to give a satisfactory performance in this field.

Anticipate Service Demands

It would seem to be fundamentally sound to anticipate that a piece of mechanism as complicated as an automobile, even if placed in the hands of the most expert operator but subjected to the variables of climate and road condition to which it is generally exposed, would, even if initially perfect in design and in the selection of materials, and in the manufacture and assembly of component parts, be subject to wear and depreciation that, at some time or other during the life of the device, would make attention necessary in the way of adjustment, repair or renewal of parts, which could only be properly taken care of in an adequately equipped shop, manned by a trained and intelligent organization. It would seem to be equally rational to assume that the provisions of such facilities would constitute an adjunct to the business of manufacturing and selling

automobiles that could not only perform its functions to the enhancement of the reputation of the product that it serves, but also accomplish this result on a profitable basis.

It is probably too much to expect that a vehicle as it leaves the manufacturer's hands should be perfect and that no variables of performance or construction should be present. In the event of the presence of these variables it is not to be assumed that the purchaser should be penalized by having to bear the burden of the results of these shortcomings. On the other hand, it is possible that a moderate expenditure on the part of a selling organization in the way of free service may be a legitimate form of advertising, particularly in new territories, or with particularly unskilled operators.

A Problem of Design

It is self-evident that the facilities mentioned cannot of themselves insure satisfactory service or insure that minimum of maintenance expense which is rapidly becoming essential. The designer cannot content himself with creating a clean-cut, neat design with proper factors of safety in materials and adequate bearing surfaces and facilities for lubrication, if the components are so related to each other that only with an unwarranted expenditure of labor and the use of special tools and equipment can the machine be repaired. He must recognize that certain things will happen, making repair and adjustment necessary and must provide in the design that these can be done easily and economically, just as he knows there are certain things that must not fail except under the most extreme circumstances.

In laying down a design for a vehicle a number of limiting factors must be taken into consideration. Some of these are of a commercial nature, such as the market which is to be reached and the price level which is to be established. Some of them are of a technical nature, such as the power and performance which is to be expected and the strength and endurance which is to be built into the design. Some of them have to do with production, such as the character of the parts in relation to the equipment and plant available. Some of them have to do with operation and service, such as the number and complexity of the parts and the accessibility for repair and adjustment.

This classification is not definite, for the reason that these requirements overlap, some of them having to be consid-

ered from several angles. It is obvious that a hundred per cent solution of the problem, taking into consideration all of these factors, is difficult, if not impossible. The result will therefore be a compromise in which some of these details have been given preference over others.

Service and the Designer

In most organizations the influence of the commercial, sales and production divisions of the organization are closer to the designer than is the service end, with the result that more attention is paid to ease and economy of manufacture and to appearance than is given to the equally important matter of accessibility and simplicity in maintenance. I believe that one reason why this is so is because there has not been the unified opinion from the service department as a result of cooperative activity that there has been through the other divisions.

From the foregoing we can say that the interest of the manufacturer in the establishment and maintenance of adequate service facilities lies in three directions: **First**, that his product shall be placed in the hands of the prospective user with such instructions as are essential to insure its being operated properly; **second**, that along with the facilities for selling the product there shall be adjacent to each user an organization and equipment competent to remedy such defects in design and manufacture as may exist and for which he is responsible, and facilities for the supply of such renewal parts, and for the performance of such repair work as will be necessary because of normal depreciation from usage; **third**, an organization which, by its competence and familiarity with the product, can report the nature and scope of difficulties that develop in service, either due to defective construction or normal usage, together with criticism of the design from the viewpoint of accessibility, for the purpose of permitting intelligent and constant development and improvement of the product.

Importance of Maintenance Cost Grows

As the automotive industry grows and as competition becomes keener, as the general public becomes more automobile-wise, the question of the cost of maintaining the equipment in operation is going to bear a larger and larger signifi-

cance. The United States is the only country which, up to this time, has adopted the automobile as an every-day, all-the-year-round, continuous means of transportation. One reason for this is because, by the character of design and our methods of production, we have been able to place vehicles in the hands of the public at prices within the reach of everyone, irrespective of social or financial conditions.

The matter of the oft-discussed saturation point of the automobile market bears no significance in my mind, except insofar as we find ourselves unable to find practical means of keeping the cost of operation down to reasonable figures. How to do this has no part as a subject in my discussion, but it is a subject with which the service man and the service organization is most intimately and vitally concerned, and the sooner the service people can get together and discuss this problem from all its manifold angles and present the subject, analyzed and in detail, to the sales, production and engineering organizations with which they are connected, the sooner will we begin to make real progress along this line. It is probably unnecessary to point out that a great deal of progress can be made and, as stated before, is absolutely essential.

Spirit of Times is for Co-operation

The spirit of the times is for increased cooperation in the development of matters of this sort which will move forward, the individual with the industry. This cooperation does not mean the elimination of rational competition, but it does mean the elimination of unreasoning antipathy to associating and exchanging experience on a cooperative basis with others in the same line of endeavor.

It is not so many years ago that the automobile industry was composed of a group of units, each individual being suspicious of the methods and ideals of its competitors. Our factories were locked up, and particularly our experimental and engineering departments were guarded most jealously.

The contact and association between manufacturers that has been developed in the National Automobile Chamber of Commerce, growing out of the Association of Licensed Automobile Manufacturers, and the interchange of ideas and the expansion in knowledge that has resulted from the growth of the Society of Automotive Engineers, successor to the old Mechanical Branch of the A. L. A. M., has been in harmony with the increase in cooperation in all lines of endeavor. The results have indicated how much is to be gained by this form of association and interchange of ideas.

Within the last several years there have been held in Chicago in connection with the National Automobile Show, a meeting of the S. A. E., devoted to the subject of service. While the attend-

ance at these meetings has been fair, it has not come up to the full possibilities. We are prepared to admit that the programs may not have carried the fullest appeal to the service men. At the same time, it is fair to state that it has been exceedingly difficult to get competent service men into the frame of mind where they would open up and present their views. It is no unfair criticism to suggest that possibly the service men as a class have not come up very far from the status of mere repair men and have not obtained the broad view of the necessities and possibilities in their field that can be developed. As stated, this is no criticism but merely an endeavor to point out the need for a broader viewpoint to be obtained only by mixing and thinking in broader terms.

Development of the Industry

You will readily understand that the first engineering talent that came to notice in the industry was that which designed the vehicle. This is self-evident for the reason that no ingenuity could be exercised in constructing and servicing vehicles until the designs had been created. We can all recall the advertisements of earlier days in which the names of famous designers were placed before the public as sufficient reason for their purchasing the product that they had created.

Following this creative period, we came into the period of rapidly expanding production. With an eager public apparently able to absorb an almost unlimited output, it is only natural that the problems of service should have received relatively less attention than the problems of production. I believe that this condition has changed, and that we are entering into a third period in which the question of properly selling the product and of keeping it sold is involved.

It is of fundamental importance to the growth of the industry that professional jealousy or lack of sympathy between these various divisions should be eliminated and, that in their stead, should come the most complete harmony and cooperation. It is manifestly impossible for any but the most exceptional man to become expert in all of these various lines. It is equally certain that expert advice from all of these fields is necessary to satisfactorily develop the automotive vehicle. It is therefore essential that organizations should exist in which the members of the different groups can cooperate and interchange experience with their fellows in the same group and in the entire field.

Broad Vision Needed

To do this requires a broader vision of the subject than is possible for the ordinary man to obtain in his own limited sphere of activities. The value of service to the industry and the importance of the service man are such that he should not be content to drift along with the times, but should take active steps to place his part of the industry

and himself on a par with all of the other divisions and individuals.

I believe that the only way this can be done is by effective cooperation. The formation of local service organizations is an excellent and effective way to accomplish this to a very large degree. There are, however, many phases to the business of service and each has its own problems as well as common ones. As an engineer, I naturally see the engineering side most clearly, and therefore in addition to this form of general organization, I believe that for the service engineer, at least, he should avail himself of every opportunity for association with his fellows in the industry.

It is in this field that I believe the S. A. E. can be of assistance. The constitution of the society, in citing qualifications for membership, recognizes the standing of the competent engineer in the service field, as well as in the production and designing fields. For the service engineer to correctly analyze his problems, he must have, in addition to the experience gained by close association with the vehicle in operation, a broad view of the principles underlying the design and production of the vehicle. This is just as important to him as it is to the designer to have before him the necessities of operation. To get this broader viewpoint, they both need more intimate contact, which the society has the means to provide if advantage is taken of its facilities.

Six Points to Remember

In closing, let me emphasize the following:

1. Automobiles are a transportation necessity.
2. To fill this need satisfactorily, there must exist efficient and sufficient service facilities.
3. We do not have these facilities in the necessary quantity and quality today.
4. The business of furnishing service in this field of transportation can be made profitable if conducted properly.
5. To conduct it properly and thereby profitably, there is much to learn and many problems to solve.
6. In learning the requirements and solving these problems, cooperative endeavor in helping the weak to become strong will help the strong to become stronger.

It may seem that the valuable aid which the service organization can render to the selling and manufacturing departments would be an asset that it would be desirable for an individual concern to develop to the point where no one else could compete. Such a conception would require guarding the methods and processes in use with the greatest secrecy. The growth of industry in the past and the potential growth in the future makes it evident that no individual organization can possibly control this factor or supply the facilities that should be available to adequately provide for even its own product.

Illinois Dealers' Association to Foster Local Organizations

1923 Campaign Outlined at Quincy Convention Provides for Closer Business and Social Relations Among State's Automotive Merchants

By CLYDE JENNINGS

QUINCY, Ill., March 19—The Illinois Automobile Trade Association met here today on the coldest day of the year. About 200 dealers braved a blizzard that swept the entire state Sunday to attend. There was only a one-day session and from the Association standpoint the chief interest was centered in the discussion of the policy for the next year.

F. C. Zillman, manager, suggested in his annual report that the 1923 campaign be based entirely upon the development of the local association. The idea is that the State Association cannot hold frequent enough meetings to bring the members together for the social acquaintance that is regarded as necessary for the promotion of the business ideas that the Association has in mind.

Zillman submitted as a part of his plan an idea of supplying a new or dead association with an "association kit" which includes letter heads, envelopes, standard constitution and by-laws, a multiple writing machine and other supplies and equipment suitable for secretarial work. The State Association will recognize only associations that employ paid secretaries and which are equipped to do the work. Zillman said that he had found by a study of the local associations that they often died or became dormant because the secretary was a dealer who had been made the "goat" by fellow dealers and that this man did not have the time or the inclination to carry on the correspondence.

All local membership campaigns to be made this year are to be in behalf of the state association by local associations. The State officers will not try to enter any territory until a local association has been formed.

This plan proved popular with the members and in the period allotted for suggestions for new ideas for the association, there was no dissent but only added suggestions for making this plan effective. The State Association is now working through 31 affiliated local associations, of which Zillman said one-half are active, one-fourth active on occasions and one-fourth dormant most of the time.

The Association also has entered into a plan with the Illinois Automobile Clubs whereby a roster of the State Association members will be carried in the car owner lists as suggestions for reliable service while touring the state.

President Burns in his report said that the membership of the State Association had been increased by about 200 members during the last year and it could

Resolutions Passed at the Illinois Automobile Trade Assn. Meeting

1. Resolved, That the Illinois Automotive Trade Assn. hereby expresses its commendation and indorsement of Senate Bill No. 49, known as "State Police Bill," believing that the provisions and regulations contained in this bill will be of immense benefit to the users and operators of motor vehicles and to the whole people of the state of Illinois.

2. Resolved, That the Illinois Automotive Trade Assn. go on record as urging upon the Sixty-eighth congress the repeal of the so-called "war tax" now levied upon the automotive industry; that this tax was conceived in the time of war as a necessary financial measure for war purposes; that the war for which this tax was levied has been ended for four years and that the original purpose for which this tax was levied no longer exists and that the tax is a burden upon the automotive industry, on the buyers and users of motor vehicles and equipment and that it is a hindrance toward bringing all business back to a normal basis of prosperity.

3. Resolved, That the Illinois Automotive Trade Assn. urges upon the manufacturers of motor vehicles the advisability and necessity for making surveys of retail territory for the purpose determining the absorptive capacity of those territories in the retailing of automobiles and that such surveys shall be the basis for production of motor vehicles rather than the productive capacity of the factories.

4. Resolved, That the Illinois Automotive Trade Assn. urges upon the manufacturers of motor vehicles that they abandon all efforts at "forceful feeding" and that contracts for retailing of motor vehicles be determined upon the basis of absorptive capacities of retail territories.

5. Resolved, That the Illinois Automotive Trade Assn. go on record as indorsing and in support of a resolution adopted in the Sixth Annual convention of the National Automobile Dealers' Assn. in Chicago in January, 1923, in which the national association condemned the so-called "trading-allowance" as a "deceit upon the public" and "an unfair trade practice" which encourages loose methods of automobile merchandising and is responsible for some of the troubles in the handling of used cars.

have been increased more but the directors thought it best for the manager to devote more of his time to other than membership work. A membership drive was planned last fall but on the dates selected the entire state was deluged with a most unusual rainstorm and the plan did not work out as well as expected. A similar drive is being arranged for in many communities this spring as a result of the work done last fall.

Paul J. Killeen of Galesburg was elected president, succeeding B. B. Burns. Killeen in his introductory remarks gave full accord to the plans of the year.

The program included an address by A. V. Comings, who made a number of detailed suggestions for increasing the sales and shop efficiency for 1923. A. R. Kroh urged more intensive dealer activities and cited many examples of slack work. In his usual vein, he was a severe critic of the methods of the dealer and his salesmen.

C. A. Vane of the N. A. D. A. told of the results of the researches of the National Association last year. These figures were based chiefly on the theoretical profits of the dealers and the proportion of failures. Also he gave information regarding the accumulated stocks of used cars. Vane advocated fewer but better and more prosperous car dealers.

Both Kroh and Vane spoke in rather a pessimistic and critical tone to an audience of the best dealers in the state and when Tom Hay of Chicago took the floor in defense of the dealers and the wonderful work they had done in creating 12,000,000 car owners, there was started a controversy that enlivened the closing hours of the discussion.

One activity of the State Association that brought much comment was the listing by the State Association of all pending legislation before the State Legislature now in session. Each bill was commented upon and this listing has organized a very definite opposition to some particularly oppressive legislation.

The 1924 convention will be held in Galesburg.

In addition to Killeen, the following officers were elected: First vice-president, R. C. Cook; second vice-president, Morris Adler, Quincy; third vice-president, George Kelsall, Joliet; fourth vice-president, C. R. Constant, Springfield; treasurer, H. B. Pinkerston, Peoria; directors, H. Dale Rue, Bloomington; H. G. Wangellin, Belleville; J. A. Hedrick, Decatur; Harry P. Branstetter, Chicago; H. E. Halbert, Chicago, and Jay A. Colvin, Chicago.

Some Pertinent Facts Regarding the Regulation of Oil Pressure

The Maintenance Man Who Stretches the Relief Valve Spring Invites Trouble Unless He Knows What It Is All About

IMPROPER understanding of the real functions of the oil pressure relief valve will often lead the service man into an error which can result in considerable annoyance to the car owner, if not in actual damage to his car. The function of the oil pressure relief valve is to maintain the pressure on the oiling system somewhere near a constant, or at least a pressure proportional to the duties required of the engine.

How the Relief Valve Works

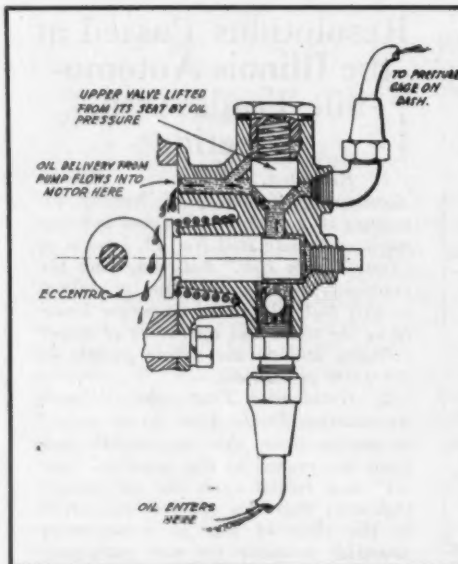
The usual installation of the pressure relief valve is such that the oil from the pump strikes against a valve held on its seat by spring pressure. When the pressure upon the pump rises to a sufficient degree to compress the valve spring, the valve opens, allowing oil to pass the valve and enter a by-pass which conducts this oil back to the crankcase.

Some manufacturers believe that the oil pressure relief valve should be put closely adjacent to the oil pump, and others believe that it is best to place the relief valve in such a position that it is not operative until the oil has passed through the pressure line, particularly through the hollow crankshaft before reaching the relief valve. Those who place it close to the pump believe that there is a certain amount of mechanical wear on oil and if only the oil that is necessary for lubrication is circulated, that the oil which is by-passed in this way will be kept free from this mechanical wear and will remain in good condition longer than if all the oil were circulated through the pressure system.

Those who place the oil pressure relief valve at the end of the pressure line do so because they want to be sure that the oil pressure is as indicated at the end of the line and does not taper down to nothing at this point, in spite of the fact that oil may enter the pressure line under the proper degree of pressure. It will be seen, of course, that both sides have their arguments and that the matter is one for the individual concern to decide. This, of course, is a matter of design and does not affect the service man directly.

Proper Pressure Important

What does affect the service man directly is that he should realize that the spring on the pressure relief valve is so set when the car leaves the factory as to provide the proper quantity of oil to the system. In other words, a car which is designed to operate at a normal oil



This shows the construction of the Hudson oil pump relief valve. The pressure of the spring has absolutely no effect on the amount of oil delivered, as no by-pass is incorporated. It does, however, determine the pressure in the line leading to the gage. This is not a high pressure system, as may be readily determined from the nature of the pump. The pressure gage merely performs the function of showing that the pump is delivering. As this is not a high pressure system, sometimes maintenance men will make the mistake of trying to boost the pressure by increasing the tension of the spring. This is a mistake, as a change in the tension of the spring will affect the reading of the pressure gage, but will not alter the amount of oil delivered unless it can be made so weak that the valve seats improperly.

pressure of 5 lb. per sq. in. will not operate properly at 15 to 20 lb. per sq. in.

The bearing clearances and the amount of oil thrown from the ends of the connecting rods into the cylinders are designed at the factory. A service man who takes it upon himself to alter these conditions without knowing exactly what he is doing and why he is doing it may change a very good performing car into an oil pumper, one which so quickly and completely fouls the spark plugs that the owner has very little satisfaction from it.

Oil Must Have Proper Viscosity

There are a great many ways in which the service man may fall into the error of believing that the relief valve is not acting properly when in reality it is. One of the greatest dangers is for him to test the oil pressure on the car that is brought in without first ascertaining that the oil in the crankcase is of the proper viscosity. One thing that should be particularly kept in mind in adjusting the relief valve is to be sure that the oil in the engine is of the proper quality.

If the oil has become diluted and is practically only kerosene, which, particularly at this time of the year, frequently happens with owners who do not periodically have their crankcases cleaned and new oil put in, the adjustment made is quite certain to be too high, because the thinner the oil the lower the pressure produced by the pump. The pressure gage will, of course, register much lower

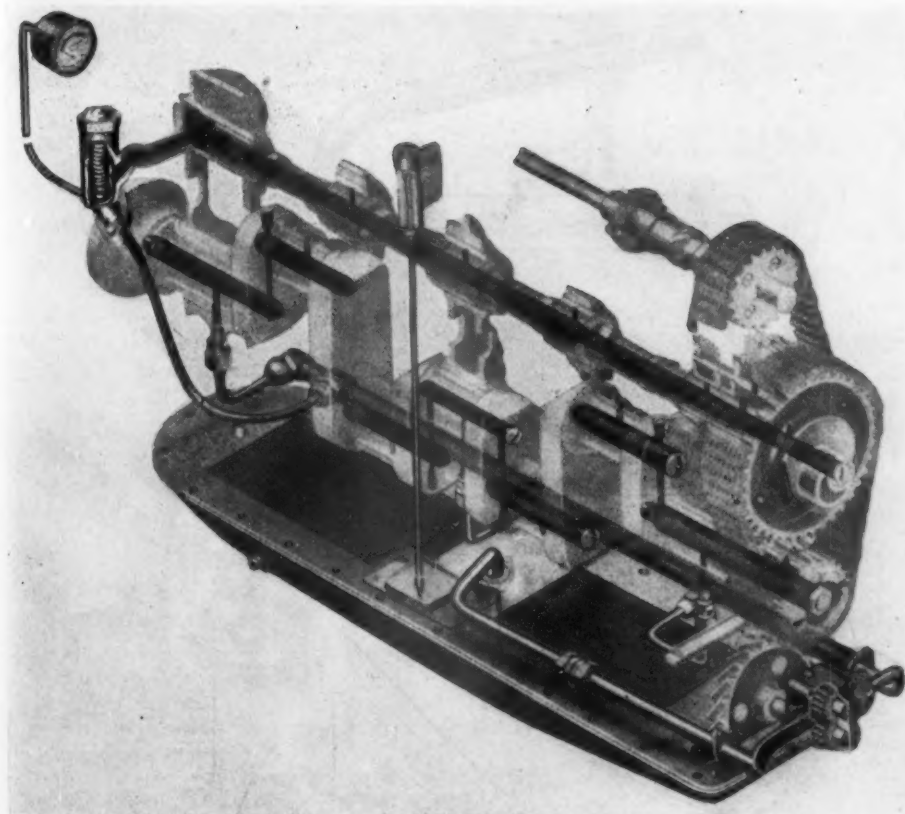
with the thin oil than it would with the oil of proper viscosity.

It will be interesting to note the discussions given, for instance, by the Hupp Motor Car Co. on adjusting the oil pressure relief valve. This is a standard operation and instructions are as follows:

"A—Check condition of crankcase oil. If not of proper thickness, drain crankcase and put in fresh oil. B—Remove relief valve cover nut. C—To raise pressure, turn slotted brass nut clockwise. To lower pressure, turn in opposite direction. Note—Adjust pressure according to foreman's instructions. D—If pressure cannot be correctly adjusted, remove entire oil valve assembly. E—Clean out valve hole in crankcase thoroughly, being sure that oil copper gasket is removed. F—Disassemble valve and clean parts thoroughly. G—Reassemble, using any new parts required. H—Stretch spring, or install two springs nested together if necessary. I—Stick new copper gasket to end of relief valve body, using special grease. J—Install valve assembly and pull up same securely, using open-end wrench. K—Adjust to proper pressure as indicated. L—Install cover nut securely."

Stretching the Spring

It will be seen that there are times when it is necessary to stretch the spring or install two springs nested together. The maintenance man, however, who arbitrarily stretches the spring on the oil pressure relief valve without having first made certain that either the pump gears



The Cadillac oiling system. The pressure under which the oil is forced to the main and connecting rod bearings is controlled by a ball valve regulator located just behind the right hand cylinder block. Overflow oil from the valve is delivered to the hollow camshaft and other points

are worn or the oil in the crankcase is diluted, or some other adverse condition applies, is taking a long chance on being right.

The pressure that an oil system is supposed to carry depends very largely on the volume of oil which passes through the pressure system. Every engine manufacturer has his own ideas regarding the relative volume and pressure of oil. On the Hupmobile, for instance, for cars in Michigan, Illinois and other flat territories, the standard pressure is 5 lb. at 20 miles per hour in high gear, and the other requirement is that the gage must show some slight pressure whenever the engine is running.

On the other hand, the Courier company employs a small Falls engine in connection with a dry sump system and sets the relief valve to blow at 45 lb. The engineer states that the reason for setting them at this particular pressure is that the pump gears begin to get noisy at pressure above 50 lb. and because they want to save the gage. From this it may be seen that some of the engineers, at least, have extreme ideas on pressure and the systems in use are designed in accordance with the ideas of these engineers.

Knowledge of System Necessary

Before feeling free to change the pressure at which the relief valve blows off, therefore, it is evidently quite necessary to know what the engineer had in mind and how the system is supposed to oper-

ate before making any adjustments. If a large volume of oil is being used, the pressure is quite sure to be much lower than if a small volume is used. If, with a large volume system, the service man stretches or in any other way increases the tension on the relief valve

spring, it is evident that a tremendous stream of oil is going to be thrown off the ends of the connecting rods, and in spite of good piston and ring design, fouling and smoky engines will result.

The practice of a garage service man making any changes of any kind in the design without instructions from the factory is always bad and should always be strongly advised against.

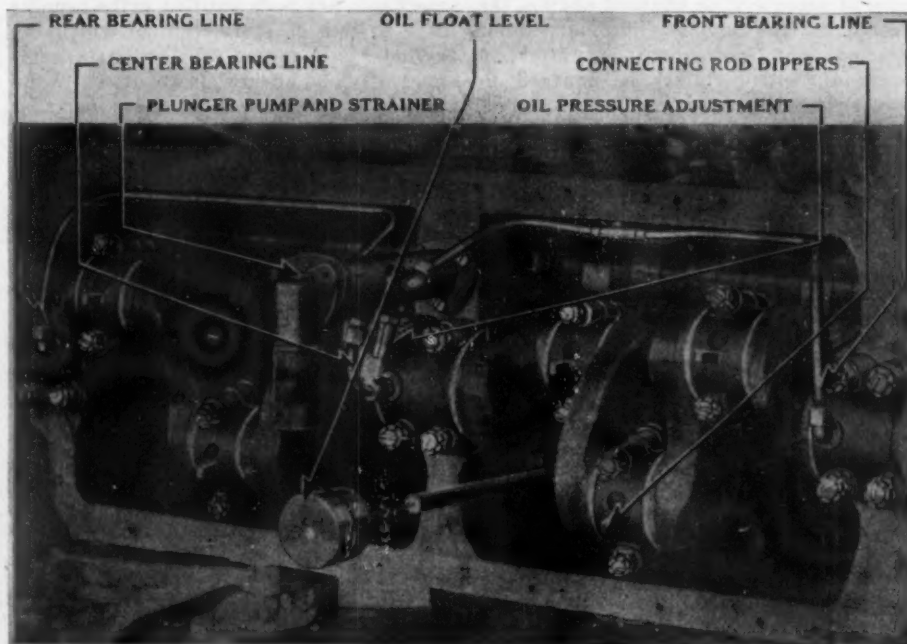
The fault is not all with the maintenance and service man, as some engineers point out. A communication from A. P. Brush, a well-known consulting engineer of Detroit, on this subject throws a light on it from another direction. Bearing in mind that Brush has a system of his own in which the vacuum in the intake manifold is used for the control of the amount of oil pressure, this system being used on the Marmon, Midwest and other engines, a substantial grain of truth is given. Brush's communication on this interesting subject is as follows:

Over-Lubrication of Some Parts

"Let us first consider the conventional pressure feed lubrication systems, having oil delivery holes to the crankpin bearings located at the point of greatest radius on the crankpin and with a blow-off relief valve to control the pressure.

"In a system of this kind relief valve spring tension, engine speed and bearing clearances all co-act to determine the rate of throw-off of oil from the crankpin bearings to the cylinders and pistons.

"Now let us bear in mind that cylinders and pistons are the only parts of a motor car engine mechanism which can be over-lubricated or let us say the only parts of an engine mechanism for which a surplus of lubricant will cause trouble to the user. The cylinders and pistons



Oil pressure adjustment on the Paige Model K-1 6-39 can be made only after the oil pan has been removed. The pressure is regulated by a screw adjustment on the side of the oil pump. The oiling system of this model, a 1917, is of the constant level splash and pressure system

of a motor vehicle engine can be over-lubricated to an extent that will cause trouble, with very little oil, whenever the engine operates at little or no load, especially if the engine speed be high.

"On the other hand, if the engine load be anywhere near maximum, it is pretty difficult to over-oil pistons and cylinders, no matter what the engine speed is; but under these conditions of operation it is very easy to under-oil pistons and cylinders, with disastrous consequences.

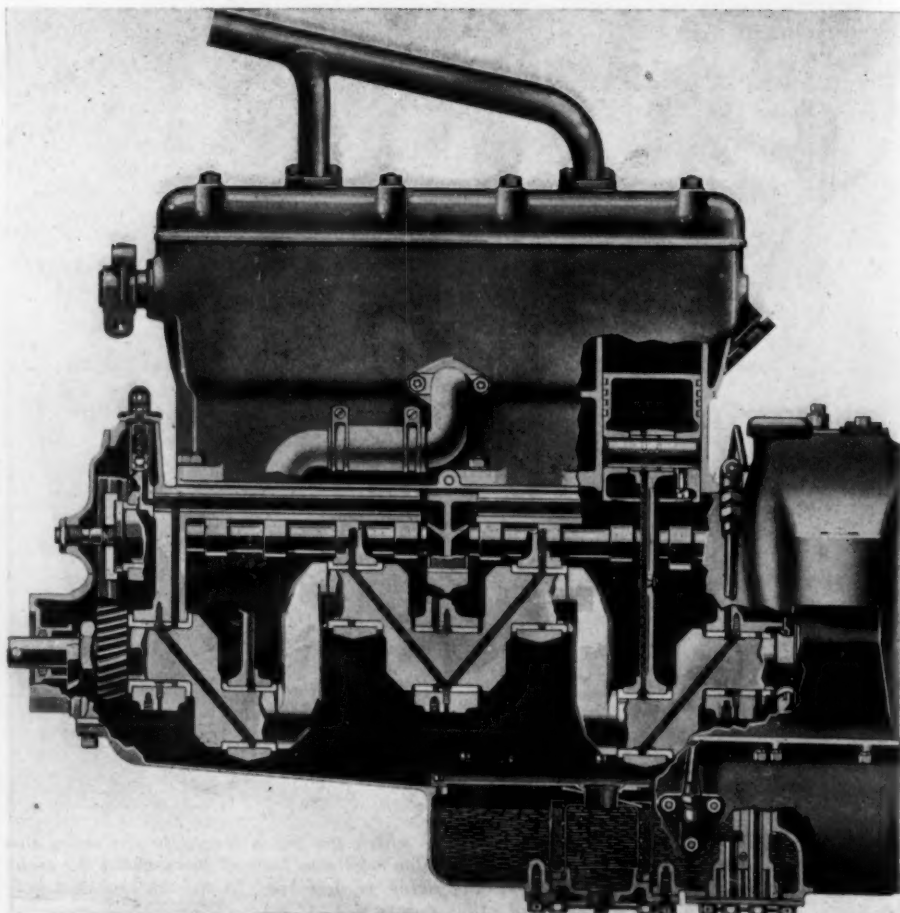
"With a system of this kind, the service mechanic is up against this proposition: there must be sufficient oil thrown off to the pistons and cylinders at all engine speeds to prevent undue wear or scoring of the pistons and cylinder with the engine operating at maximum power output at all speeds. This, in the nature of things, must mean some degree of over-lubrication at light engine loads at all speeds.

"Obviously, over-lubrication of pistons and cylinders, with attendant high oil consumption, high rates of carbon deposit, carbonized valves and more or less carbon fouling of spark plugs is annoying and expensive to the user, but less annoying and less expensive than one or more scored cylinders.

Effect of Tight Bearings

"If an engine comes to the service mechanic for overhaul and if the overhaul includes bearing adjustments, the adjustment of the crankpin bearings will, in the nature of things, reduce the amount of oil thrown off from the crankpin bearings to the pistons and cylinders, with danger of scored cylinder if the car is driven hard. Naturally, the service mechanic is tempted to raise the oil pressure and avoid this danger.

"Carbon deposits, high oil consumption and dirty spark plugs can, with some degree of propriety, be charged against the design of the engine, but burned-out bearings and scored cylinder, after an overhaul, will certainly be charged to the service mechanic. So long as manufacturers continue to put this situation up to the service mechanic, just so long will users be up against over-oiling trou-



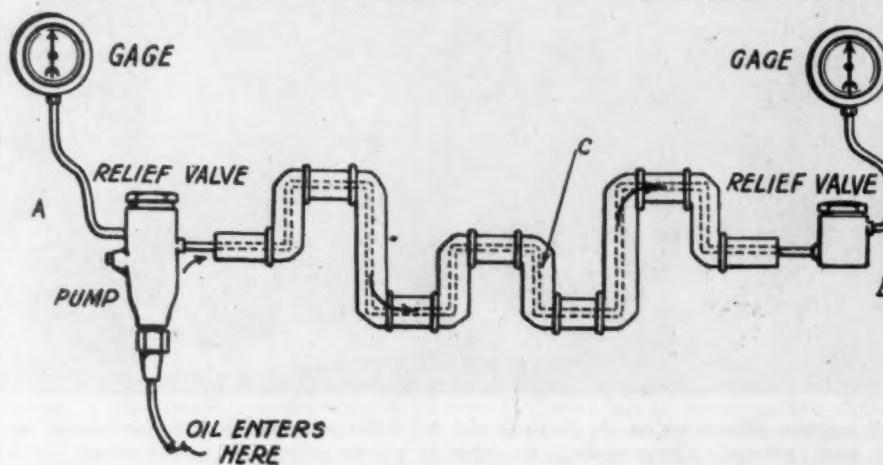
Sectional view of the Continental K4 engine, showing the method of lubrication and also the oil pressure control valve located at the top of the timing gear housing. The adjustment is very easy to get at. The pressure will vary from 10 to 25 lbs. on this engine, depending on the speed of the vehicle, viscosity of oil and general operating conditions

bles in their engines after engine overhaul in service stations.

"The automobile user and the service mechanic are both entitled to the benefits of a system of lubrication in which the cylinder and piston lubrication is automatically and accurately regulated to the widely varying needs of these parts at all different combinations of engine speeds and engine loads.

"This should and can be accomplished

without in any way interfering with continuous and adequate lubrication of all other engine mechanisms but undoubtedly it will not be accomplished until both the manufacturer and the user of automobiles come to an understanding of the fact that very many dollars are being spent for needless service, because the manufacturer does not spend a relatively few dollars for needed development."



Here is shown a schematic diagram which illustrates a point in connection with locating the pressure gage. It will be observed that the oil pump is located at the left of the hollow crankshaft and that a pressure gage is located above it together with the relief valve. At point B we have much the same condition except that there is no oil pump. Now, with the gage located as at A a reading is obtained wherein the oil has not as yet passed through the crankshaft. At B the reading on the gage indicates the pressure in the system after the oil has passed through the shaft. If the line should be clogged then the gage when located as in A will give a false reading, as there will be a rise in pressure which may not be readily observed as a danger signal to the average operator. Under the same condition the gage B would not register at all and the operator is warned of impending trouble

Storage Featured in Large Sales and Service Building

*Roomy Storage Floors and Ramps of Unusual Dimensions
Make Car Handling Easy for Customers*



The front of the building is very plain, though well handled for a concrete structure of this type



Showroom with its tile floor and arched girders; here again simplicity is the rule

WILMINGTON, DELAWARE, is the proud possessor of a very creditable addition to the rapidly growing list of important automotive buildings. This structure was planned and built to house the business of the Wilmington Auto Company, to furnish storage facilities to Wilmington residents and also the great number of transients who make the night stop there.

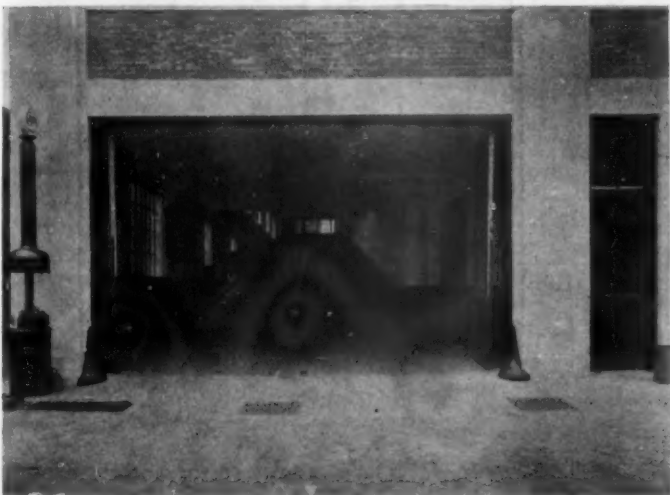
As will be seen from the plans, the bulk of the building is given over to storage though there is no crowding, the garage space being 20 ft. wider than the

general run. Every car space is provided with a concrete flatiron guide and along the aisles are numerous revolving washers so that cars needing washing may, as a usual thing, be given attention by simply pushing them forward into the aisle.

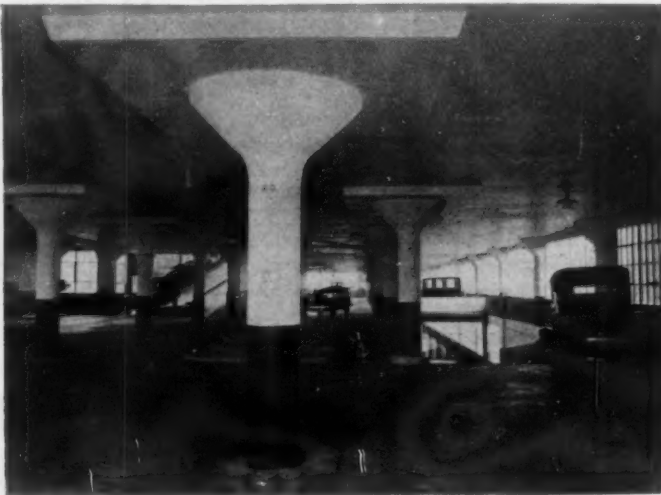
The entrance to the garage is on Eleventh street, the building extending the entire distance, 290 ft., between Tenth and Eleventh. There are two entrances each having electrically operated folding doors controlled by buttons located in the checker's booth. One en-

trance is to the ground floor and the other opens directly to the ramp to the upper floors. No car can enter or leave either doorway without being seen by the checker.

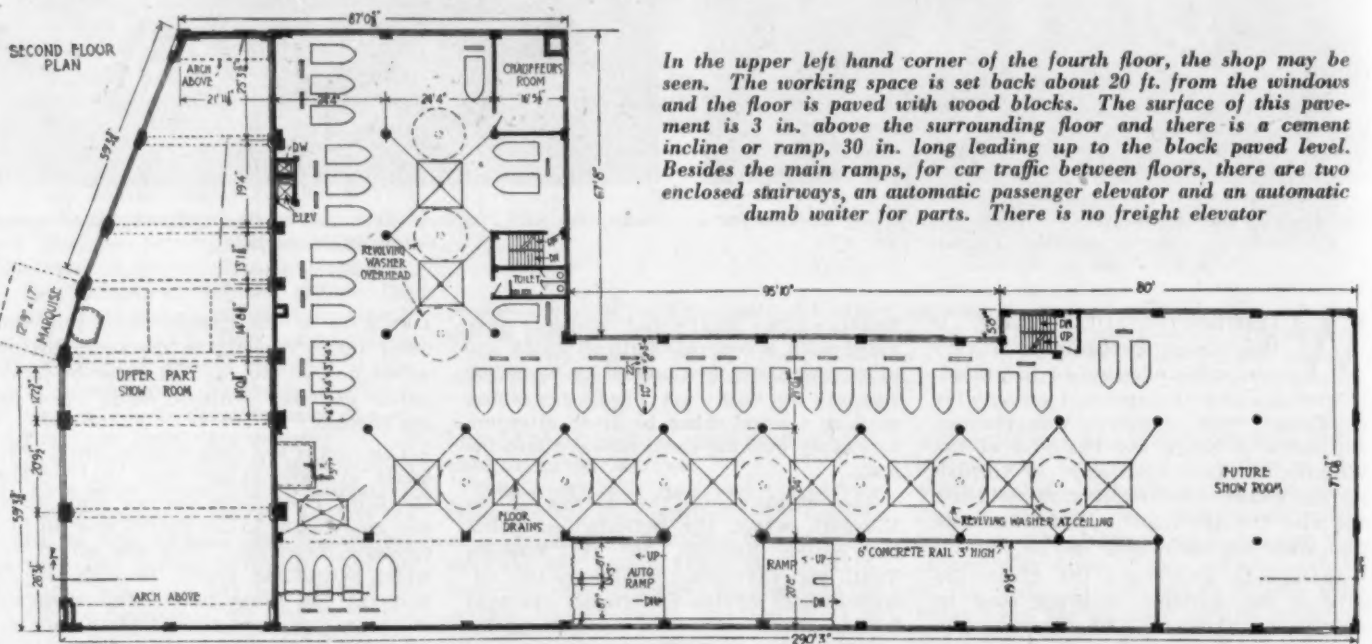
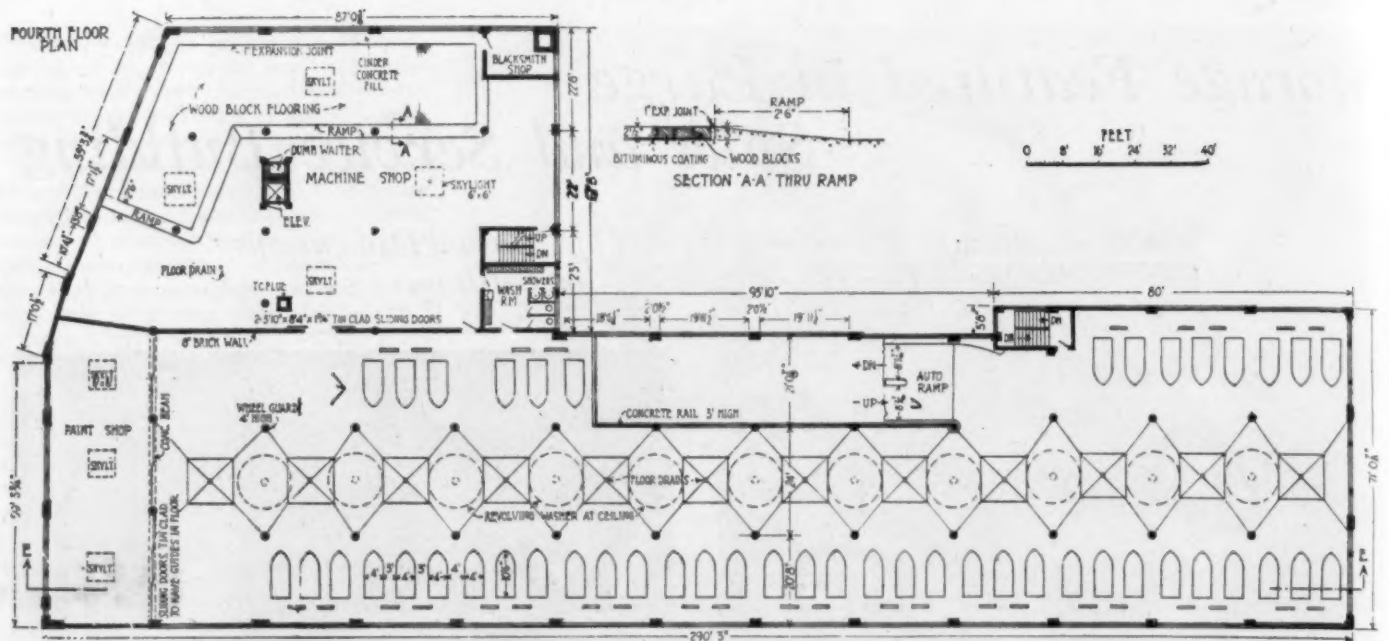
The ramps are very simple, being perfectly straight ahead from the first to the third floor, here the car must turn and go straight to the fourth floor in the opposite direction. They are all 18 ft. wide, permitting traffic in both directions at the same time. The surfaces of the ramps are given a tooth to prevent slipping by the application of alun-



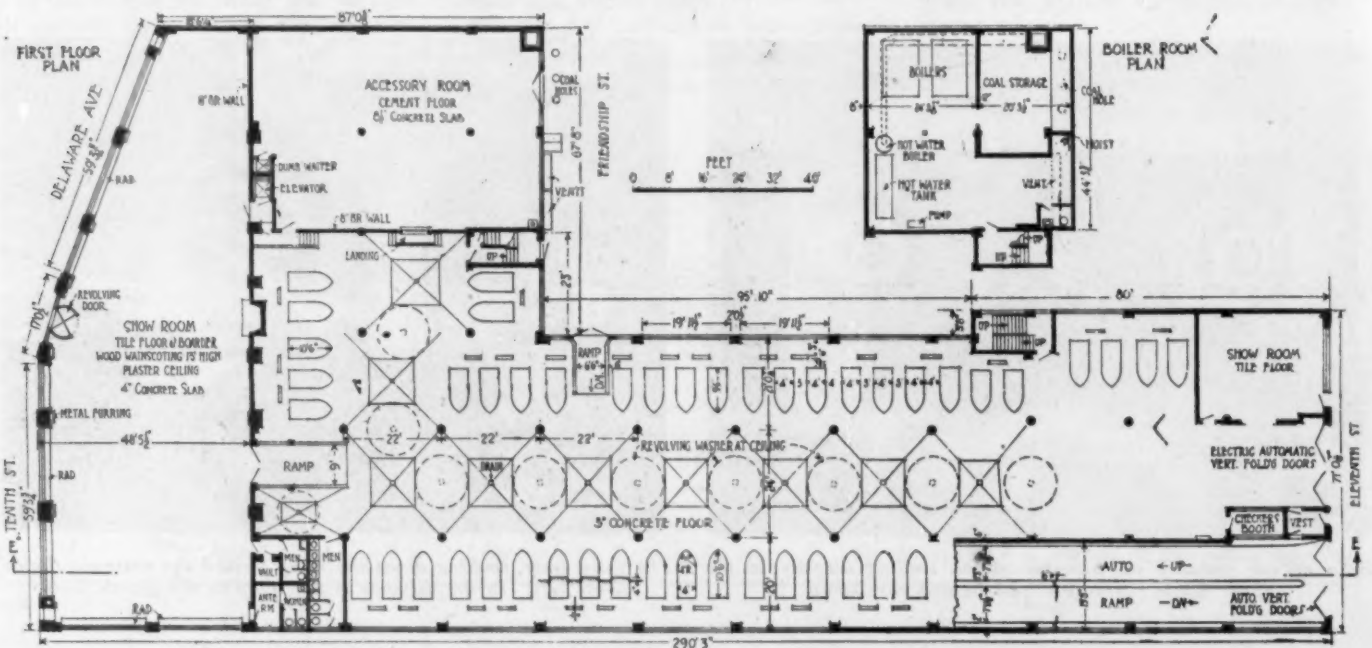
Main garage entrance on Eleventh street, leading directly to the upper floors. Note the well lighted easy ramp



The third floor, looking down the ramp toward the entrance shown at the left. In the distance is the ramp to the fourth floor

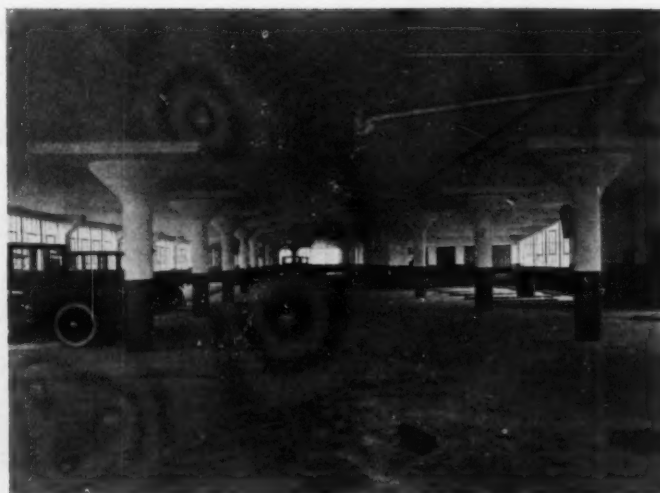


In the upper left hand corner of the fourth floor, the shop may be seen. The working space is set back about 20 ft. from the windows and the floor is paved with wood blocks. The surface of this pavement is 3 in. above the surrounding floor and there is a cement incline or ramp, 30 in. long leading up to the block paved level. Besides the main ramps, for car traffic between floors, there are two enclosed stairways, an automatic passenger elevator and an automatic dumb waiter for parts. There is no freight elevator





The shop looking towards the corner with passenger elevator in center. The slightly raised block pavement may be plainly seen



View of the third floor looking forward from the extreme rear. One of the overhead washers is shown in the foreground

dum and oil is eliminated by conducting it into a groove where it runs to a catch basin at the foot of each.

Turning to the dealer phase of the establishment, every service operation that owners of Buick cars may desire is provided for. The ample showroom on the first floor is novel in that, in spite of its 46-ft. span, it has no columns to interfere with the placement or display of cars. It is spanned by heavy concrete arched beams which successfully carry the columns supporting the fourth floor and the roof. This is shown very nicely in the sectional view which also shows the ramps to good advantage. The

rear wall of the showroom has walnut panelling and the floor is of oil proof decorative tile.

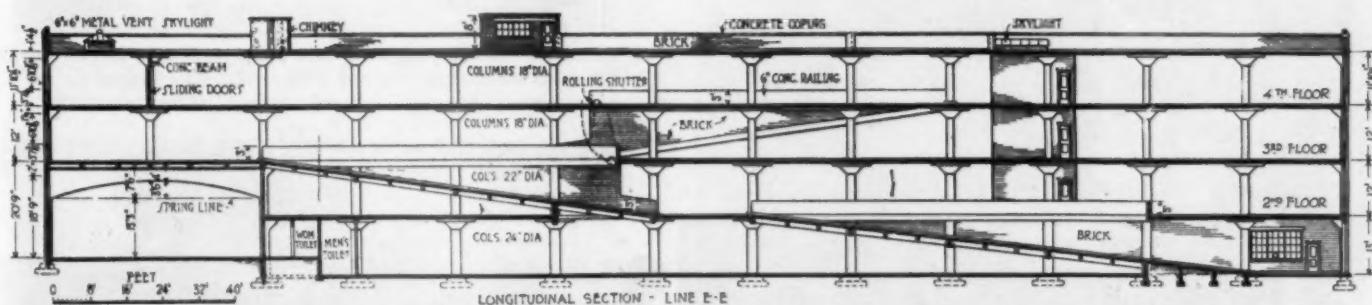
Back of the showroom is the accessory and parts room, facing on a court and well supplied with light. This is on the same level with the showroom but the garage is about 4 ft. lower, reached from the showroom by a ramp and from the accessory room by steps.

The shop is on the top floor and has the working space paved with wood blocks to make a better surface for the men. A dumb waiter transfers parts from the stockroom to the shop and an automatic passenger elevator just back

of the showroom connects with all floors. There are showers, lockers and ample wash bowls in the shop toilet, and the blacksmith shop is in a separate enclosure to avoid chance of fire.

A paint shop is provided with folding doors so that each car is accessible at any time. A used car showroom is provided beside the garage entrance, but it is very small and is only a sort of reception room or show window to the larger showroom on the second floor.

The building was designed and built by Thompson & Binger, Inc., engineers and contractors, New York City. Raoul C. Gautier, Chief Engineer.



This sectional view shows the arrangement of ramps, cars making a straight run to the second and third floors and then doubling back to the fourth. The construction of the ceiling of the show room and columns above the heavy arched beams is also brought out plainly

Dan's Diary

FEB. 1—The books says you shouldn't write about the wether in your diary but when its so cold that you can't get nuthin done sept put your fingers in your pockets to get 'em warm and take 'em out and get 'em cold only it takes three times as long to get em warm and half as long to get em cold what you goin to do? The wether is about all you can think about and most of them thinks is Gee-Heck-I wist it wasent so cold which dont get no work done.

Today I was under a car tryin to fix one of them Benedicks drives which had the spring busted in it because cold

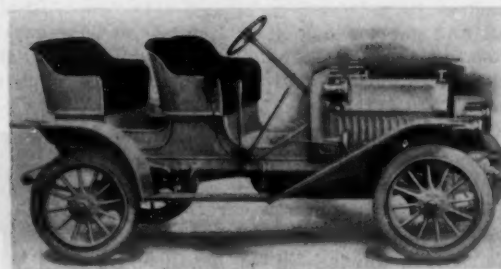
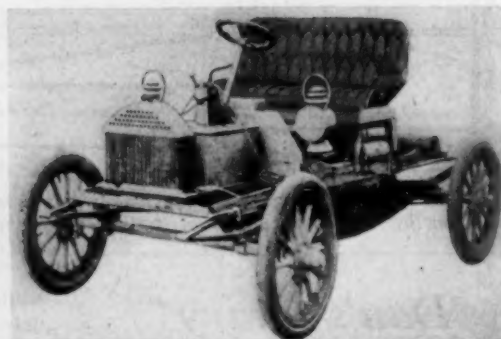
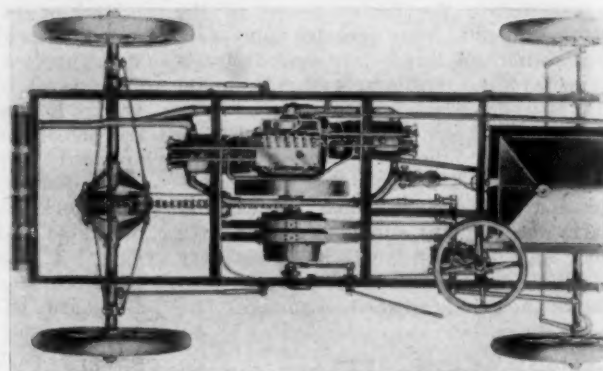
wether is pretty hard on them Benedicks drives anyhow, oil gettin thick and actin more like glue than if it was oil. Well between the cold floor petrifyin my spinal colyum and my fingers gettin num stickin um way up in them cold housings fussin with them nuts and washurs, me cussin all the time, I gess a fella has a good excuse for sayin something about the wether.



Some folks like cold wether wich makes more bisnis for them. Hogan the Plumer throwin out pipes most all the time, but cold wether dont make work for us except certain kinds of work which is freezups and rundown batteries and a hunk of ice under the Carb. float and etc., being mostly jobs that are no fun a tall.

Today the Boss sent me out to get Sam Ketchel's buss started. Them birds that sits with their foot on the starter for a ¼ hr. till the juise is all gone and then expects us to start um with the crank gives me a pain but however you don't get very cold crankin up a cold engine which aint got enough juice to make even a spark almost.

MOTOR AGE'S PICTURE PAGES



At the top of this page is shown the millionth Buick car, which was completed on Washington's Birthday, surrounded by a group of workmen all of whom have a record of 15 years or more of Buick service. In the lower picture E. A. DeWaters, chief engineer; F. A. Bowen, assistant engineer; C. J. Ross, general superintendent; E. C. Richards, research engineer, and William Beacraft, manager of the motor department, are inspecting the car. The other pictures show the first Buick chassis—1903; a "two lugger," of 1904, and a surrey of 1908, which proved so popular that in three years 23,102 were produced

OF AUTOMOTIVE INTEREST



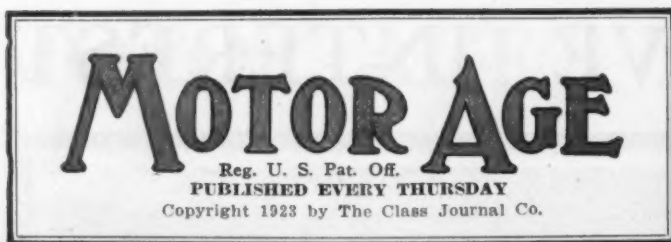
Above: One of the 81 White busses recently bought by the Pacific Electric Ry. and the Los Angeles Ry. Co.

Center: The char-a-banc is popular in England for short journeys. These busses run with the regularity of trains for distances up to 75 miles

Lower Right: London has at last got a gas station. They call it "an up-to-date automatic spirit store." Before the idea hit them they filled their tanks from two gallon cans

Lower Left: A second hand tire dealer in Islington, England. He has been trading in tires for many years and has a good stock cheap





Vol. XLIII

Thursday, March 29, 1923

No. 13

THE CLASS JOURNAL COMPANY

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| SUBSCRIPTION RATES | |
|--|-----------------|
| United States, Mexico and U. S. Possessions..... | \$3.00 per year |
| Canada..... | 5.00 per year |
| All Other Countries in Postal Union..... | 6.00 per year |
| Single Copies..... | 35 cents |

Subscriptions accepted only from the Automotive Trade
 Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.
 Entered as second-class matter Sept. 19, 1899, at the post-office at Chicago, Ill., under the Act of March 3, 1879.
 Member of Associated Business Papers, Inc.
 Member of the Audit Bureau of Circulations.

Spring

SPRING came officially last week. Spring is always associated with housecleaning, Easter clothes and a lot of things like that. Spring and perking up the house and person are close associations of thought.

Some way it appears that the automobile has not yet entered as closely into this association of perking-up thoughts as it should. Why not clean up the car as well as the house? Why not paint it, if it needs that? A lot of persons think of the car in the spring in terms of a mechanical overhaul, but not as to appearance.

It seems to have been overlooked that a good varnish job once a year on a well-painted car will keep that car in excellent appearance as long as that car lasts. Some of the beautiful paint jobs that are being turned out by the factories today will be allowed to run on and on, getting dingy and spotted, until they look like a laborer's cottage along a railroad track in the soft-coal district. A quart of varnish, once a year, will keep one of these cars looking like "a million dollars."

How many shops are equipped to put on this quart of varnish once a year in the right way? Why have we not seen a general clean up of motor cars advertised like the house-painting campaigns? Why has this idea of varnish on the car not gotten its proper hold? It

is an economic venture both for the painter and the car owner.

More decent paint shops and more paint on cars at frequent intervals would be a wonderful boon to the community that has a proper pride. Also it would be a boon to the automotive business generally.



What sort of reception do customers get at your place of business?



Associations

THE Illinois Automobile Trade Association acted wisely at the recent state meeting in deciding to carry on the promotion work during the coming year chiefly through local associations. A state association cannot supplant a local association in its activities with the great mass of dealers, neither can it work effectively if it is made up of several thousand individual members.

There is a place for a state association if it adopts the plan that will make its work effective. Indeed, we think that, owing to the legislative situation, a state association is a necessity. The plan for a state association to function best is to centralize the automotive interest in each county or other natural community and then act through the state association in units.

Another advantage of the local unit organization is that the state association executive will not need to give his entire attention to a renewal of individual memberships and can have time for the promotion of work that the state association may undertake.

The local association will be greatly benefited by its connection with the state association. Speakers can be routed through the state body, topics can be suggested for certain meetings, and in general the effort of the dealers will be focused better on certain points than can be accomplished without statewide support. There is every opportunity for better work and for a liver interest. And, after all, the social side of association work is the most important factor. The state body cannot supply this and the local association can.

The work of the Illinois association in the listing of legislative attacks on the industry in the present session of the State Assembly is alone worth many times the cost of the association activities.



The right kind of labor saving equipment is an investment that pays cash dividends.



Tire Favoritism

OLD favorites are very difficult to discard. They will return. There is a wave of complaint that we thought had been buried by tire merchants. It is merely this:

Tire merchants complain that a manufacturer will offer them a certain discount if they buy a certain quantity of tires, asserting that this is a special price made only to dealers who will take a certain number of tires. Later this dealer will learn that a merchant

in the same competitive territory has obtained this same price on a much smaller order. As a result, this dealer is paying a higher cost, because he has more money involved in his stock and he must pay rent for storage space and other incidentals to maintaining a larger stock.

This complaint is rather surprising and we do not believe that it is at all general today. There is no doubt but that it was a common incident a few years ago, but we believe that this is one of the evils that the tire manufacturers have corrected. There are possibly a few companies that are so short sighted as to do this unfair thing to their dealers, but we believe that they are few and far between.

There is only one thing for the dealer to do when he is confronted with proof of this practice, and that is to change lines of merchandise. A manufacturer who will do this thing to his dealers will do many other things that are unfair and a good tire merchant cannot afford to be in company with an unfair manufacturer.



No chance to make a profit is a bother to the keen worker in the field of business.



Simplification

THERE was held in Washington a few days ago a meeting of representatives of the various branches of the automotive industry, with a view of promoting the adoption of a program of simplification or standardization with automotive manufacturers. The idea expressed there was that the Society of Automotive Engineers has prepared many excellent standards, but these have not been put into practice to the extent desired by the men who manufacture vehicles and component parts. As a result they are merely paper standards.

The Department of Commerce, headed by Secretary Hoover, believes that there will be a great economy of transportation effected if the manufacturers will extend the use of these paper standards. It is the contention that there is too much energy wasted in the manufacture of specially made parts that fit only one vehicle, and after the energy is put into the manufacture of these special parts they become a burden upon the maintenance dealer, who must keep in stock a large number of parts so that he may properly repair the machines that come to his door. If standardization was properly adopted by the manufacturer, the dealer could lessen this stock of parts and extend better service to car owners.

One very obvious point is radiator caps. At present there are many sizes of caps, and many kinds of threads. The tourist maintenance man must keep a large stock. As a matter of fact, three sizes and types of threads should be sufficient. Gasoline tank caps are another sample. Then comes the parts of the engine that are similar in all engines, but not exactly alike.

At this meeting, M. L. Heminway of the Motor and Accessories Manufacturers' Association was made chairman of the permanent organization to carry on. The chairman will appoint a committee of the various representatives of the branches of the industry. The maintenance industry will be represented on this committee and it is more than likely that some of the expert maintenance men have definite ideas of what parts

of the automotive vehicle could be standardized without affecting the effectiveness or the appearance of the vehicles and at the same time save much in trouble and wasteful investment in shop stocks of parts.

If any of the maintenance men have ideas of this sort, MOTOR AGE would be very glad to receive these ideas and see that they are filed with the proper persons.



Through wise buying, credit is established . . . and maintained.



Eyes That See

THE prophets of old foretold events. The weather man predicts the zero wave or the rain. The signs of the times are seen by discerning ones and business methods are being revised accordingly.

Electrical concerns wishing to compete effectively with the replacement part must give more value for the money; there is no other way. Human beings are pretty much alike, and the shopping instinct is not confined to any one class. Either the genuine part must be sold on its superior value or it must be more nearly competitive on a price basis.

That at least one of the large generator and starter makers appreciates such economic facts is shown by its offering a package of genuine brushes which can be sold at a nominal price. From a house organ we quote in part as follows:

"Garages and dealers in your territory buy brushes for our equipment. If they do not buy genuine brushes from you, they are probably buying imitation brushes from someone else. *To make it easy for you to interest these men in genuine brushes, and get them in the habit of going to you for service equipment, we supply a special assortment and allow an unusually large discount.*"

The words are theirs. The *italic* is ours.



The business house with the cleanest, most attractive windows is generally the most prosperous.



Common Sense

I N a recent issue of MOTOR AGE there was printed a letter from Charles H. Emmons, an Ashtabula, O., automobile merchant, who said that he welcomed in his store the customer who had a car to trade, because this gave to Emmons' company two sources of profit.

That letter was just common sense, attractively presented. It carried the conviction that Emmons knew what he was talking about.

The letter has caused much comment among dealers and students of the automotive dealer situation. It has brought back to the publication office more comment than anything yet said on the used car situation in MOTOR AGE. In fact, many persons regard the letter as sensational.

Is it not strange that common sense should be so regarded after an industry has been worrying about used cars for several years?

285,000 March Production in Sight

Factory Schedules 10 Per Cent Higher Than Last Month

Many Plants Already at Capacity and Others Will Hit Top Speed in April

NEW YORK, March 26—Major automobile producing plants during the first part of March were operating on programs 10 per cent greater than those followed last month and presented no indication that schedules would suffer any immediate curtailment.

Conservative estimates place production this month at 285,000 and if the output should fall below that figure it would be due to conditions not now apparent. While there is a scarcity of material with some manufacturers, it does not constitute a serious deterrent, for the present at least, to sustained production and all efforts are being expended to expedite the delivery of supplies from producing areas to manufacturing centers to avoid any possible reduction of operations.

Most of the major manufacturers are operating at capacity with others moving toward top speed production in April. Indicative of the trend toward greater output is the announcement that Ford plans shortly to reach and maintain a 6000 daily schedule, the largest that the company has yet attempted. Back orders, which likewise exist with other car makers, are largely responsible for the advance.

Both car manufacturers and dealers have been preparing the way for the big seasonal demand which is already being felt in some sections and which will gain momentum from now on. Shipments are leaving factories as fast as rail facilities can handle them or dealers can drive away cars. The question of deliveries, particularly of finished products, will be less serious as roads become more passable and boat service can be utilized.

Reports coming from the middle western states show an increased buying disposition on the part of the farmer, the demand swinging with greater force toward that territory than was anticipated. Similar conditions prevail in the agricultural district of the South where the financial position of the farmer has shown vast improvement over a year ago.

With the wider use of motor busses, production of this type of vehicle is mounting. Production of rail cars is experiencing a new impetus through evidences that short line roads will adopt them more generally.

OPPOSES TRUCK TRADE-INS

PHILADELPHIA, March 23—Characterizing the practice of accepting the customers' car as part payment for a

new one as "cheap huckstering," and a "deadly heritage from the passenger automobile business," John H. Hiscock, vice-president of a Philadelphia advertising concern, vigorously attacked the truck trade-in proposition before the Motor Truck Association of Philadelphia, at its February meeting in the Hotel Adelphi.

SPRINGFIELD USED CAR SHOW

SPRINGFIELD, O., March 24—Springfield's first used car show was held last week at Memorial Hall. While not many

actual sales were made during the week the dealers participating say that they have many leads which may develop sales later. The show was given under the auspices of The Springfield Automotive Trades Association.

TRADE SCHOOLS EXHIBIT

CHICAGO, March 24—An exposition by vocational and trade schools, including those teaching automobile subjects, will be held at the Chicago Coliseum May 30 to June 10.

Tire Production Shows Big Increase

NEW YORK, March 24—Production of pneumatic casings, inner tubes, and solid tires in January of this year showed an increase over last December and January of 1922, according to the figures compiled by the Rubber Association of America for the Bureau of Foreign and Domestic Commerce.

A comparative table of inventory and production shipments is as follows:

| Pneumatic Casings | | | | |
|-------------------|---------------------|-----------|------------|-----------|
| | No. Mfrs. Reporting | Inventory | Production | Shipments |
| 1922 | | | | |
| January | 66 | 4,174,216 | 2,055,134 | 1,596,806 |
| February | 66 | 4,691,329 | 2,084,308 | 1,562,365 |
| March | 63 | 5,183,286 | 2,645,790 | 2,073,936 |
| April | 65 | 5,464,336 | 2,401,187 | 2,086,651 |
| May | 65 | 5,523,095 | 2,721,503 | 2,639,273 |
| June | 64 | 5,042,147 | 2,838,890 | 3,133,260 |
| July | 63 | 4,834,106 | 2,476,636 | 2,695,095 |
| August | 63 | 4,629,392 | 2,905,209 | 3,029,823 |
| September | 64 | 4,612,037 | 2,504,744 | 2,502,106 |
| October | 64 | 4,682,958 | 2,674,662 | 2,588,770 |
| November | 62 | 4,964,976 | 2,733,134 | 2,379,708 |
| December | 59 | 4,599,208 | 2,656,942 | 2,934,079 |
| 1923 | | | | |
| January | 62 | 4,695,916 | 3,127,270 | 2,994,297 |
| Inner Tubes | | | | |
| | No. Mfrs. Reporting | Inventory | Production | Shipments |
| 1922 | | | | |
| January | 66 | 5,246,647 | 2,343,393 | 1,889,724 |
| February | 65 | 6,141,956 | 2,596,774 | 1,702,583 |
| March | 63 | 6,991,118 | 3,017,511 | 2,090,737 |
| April | 65 | 7,230,096 | 2,650,573 | 2,329,343 |
| May | 65 | 7,189,552 | 2,970,696 | 2,938,947 |
| June | 64 | 6,186,534 | 3,130,629 | 3,973,679 |
| July | 63 | 5,675,839 | 3,068,199 | 3,630,744 |
| August | 63 | 5,207,228 | 3,808,224 | 4,220,055 |
| September | 64 | 5,164,757 | 3,501,442 | 3,558,971 |
| October | 64 | 5,488,033 | 3,787,758 | 3,420,680 |
| November | 61 | 6,210,053 | 3,850,908 | 3,075,023 |
| December | 59 | 5,732,125 | 3,411,074 | 3,825,949 |
| 1923 | | | | |
| January | 62 | 5,838,310 | 3,951,885 | 3,748,651 |
| Solid Tires | | | | |
| | No. Mfrs. Reporting | Inventory | Production | Shipments |
| 1922 | | | | |
| January | 11 | 181,769 | 40,224 | 33,294 |
| February | 11 | 183,448 | 39,492 | 36,805 |
| March | 11 | 182,197 | 49,433 | 48,350 |
| April | 11 | 173,748 | 46,664 | 52,309 |
| May | 11 | 170,904 | 57,640 | 60,711 |
| June | 11 | 169,808 | 66,089 | 63,408 |
| July | 11 | 176,375 | 71,505 | 60,425 |
| August | 11 | 189,698 | 84,313 | 69,435 |
| September | 11 | 200,015 | 82,767 | 66,797 |
| October | 11 | 213,942 | 85,480 | 71,275 |
| November | 11 | 234,684 | 85,775 | 61,466 |
| December | 10 | 244,061 | 77,221 | 64,570 |
| 1923 | | | | |
| January | 11 | 262,462 | 83,343 | 60,611 |

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any) or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch or on a consignment basis.

Durant Fills Out Line With \$525 Car

Georgia Dealers Plan to Revive State Association

Activities Suspended Some Months Ago, But Upturn of Business Brings Resumption

ATLANTA, Ga., March 24—With the automobile and accessory business steadily improving throughout the entire state, and especially among the dealers in the smaller towns and communities, officials of the Georgia Automotive Dealers Association are planning a resumption of activities, and probably will have a statewide meeting of the dealers some time this spring at which time reorganization of the association will be effected.

At the time the organization discontinued active work, some months ago, it had just arranged to conduct a statewide advertising campaign in the newspapers directed to the general public and setting forth the stability and financial responsibility of the automotive industry. The advertising copy for this campaign has been completed and there is a probability that it will be carried out if the association reorganizes.

Koether Addresses Service Equipment Associates Meet

DETROIT, March 24—B. G. Koether, director of sales and service of the General Motors advisory staff, addressed the March meeting of Service Equipment Associates held in this city, on the importance of constantly improved service methods to the automotive industry. Representatives of the sixteen companies comprising the associates attended.

Other speakers were David Beecroft, directing editor, Class Journal Co.; Clyde Jennings, editor, Motor Age; James Collins, Chilton Co.; E. M. Young and Frank G. Eastman, of the General Motors advisory staff. The afternoon was devoted to discussion of means for reducing sales costs of specialized machinery so that all repair men may obtain them.

New Cars Enter and Leave Indianapolis by Driveaways

INDIANAPOLIS, March 24—Driveaways coming to this city and vicinity with vehicles from the Michigan centers and from other out-state plants are the rule these days, as well outgoing drives from local factories. With few exceptions, practically all cars from congested territories are coming over the road. The paved roads leading down from Detroit, and Toledo to Columbus, and Dayton, Ohio, and thence across the National Highway are being followed and the state is in better position than ever to handle such driving, the National Highway paving having been completed last fall.

The shorter diagonal routes to Detroit and to Chicago are largely gravel and impassable because of spring thaws and heavy rains.

Some local dealers and distributors who up to now have had rail shipments held up are gratified that the factories have at last decided that driveaways are better than further delays. There is a brisk demand and some dealers are conducting drives twice a week in order to keep the cars coming in sufficient quantities.

Total Output of Cars and Trucks for February, 275,769

WASHINGTON, March 24—Reports received by the Bureau of Census place the total output of trucks and passenger cars in February at 275,769. The output of cars amounted to 254,415 as compared with 223,706 in January. The February truck production reached 21,354 as against 19,376 in January.

With few exceptions reports received by Government each month are from identical firms and include approximately 90 passenger car and 80 truck manufacturers. Additional data received since the publication of January production figures necessitated several revisions. The January total of passenger cars and trucks given above were revised. In addition, the figures of truck production for the period August to December, 1922, were likewise revised.

Revised figures for truck production are as follows:

| | |
|-----------------|--------|
| August | 24,466 |
| September | 19,212 |
| October | 21,512 |
| November | 21,683 |
| December | 20,050 |

GENERAL MOTORS SETS NEW MARK

NEW YORK, March 26—General Motors units, manufacturing Buick, Cadillac, Chevrolet, Oakland and Oldsmobile cars and the GMC truck, are traveling at a production pace that promises a 1923 record far in excess of the big mark set up last year, when 456,763 cars and trucks were built.

Official production figures were announced today at General Motors headquarters which shows preliminary combined sales of American and Canadian motor vehicles for the month of February totaled 55,000. This compares with preceding months and further with corresponding months of a year ago as follows:

| | | |
|----------------|--------|--------|
| | 1922 | 1921 |
| December | 47,406 | 15,381 |
| | 1923 | 1922 |
| January | 49,181 | 16,088 |
| February | 55,000 | 20,869 |

General Motors also announced that at the end of the first quarter of 1923 it had 67,115 stockholders as compared with 65,665 in the last quarter of 1922 and 70,504 in the first quarter a year ago. Of the first quarter's total 45,330 are holders of common stock.

Model as Yet Unnamed Will Be Manufactured at Flint

New Plant Under Construction Is to Have a Capacity of 90,000 Vehicles a Year

NEW YORK, March 24—Another car, as yet unnamed, but which will list at \$525, is announced by Durant Motors. It will be a four-cylinder job, powered with a Continental engine and will be built at Flint, Mich. It will not make its debut until late in the summer and at the present time no subsidiary company has been formed to manufacture it.

The plant at Flint is now in course of construction, the foundations being already in. It will be a duplicate of the other Durant plant at Flint and its cost will be \$1,500,000. The capacity will be 90,000 cars a year but no decision has been reached as to the first year's output.

It also is planned to build some of these cars in the Durant plant at Oakland, Cal. The Pacific coast price will be \$665.

This newest member of the Durant family is designed to meet Chevrolet competition. It has been under consideration for some little time, but it was not until W. C. Durant visited California a couple of weeks back that plans for production were completed.

Outside of the fact that the Continental engine will be used, no other units can be disclosed at the present time. The company has not settled on body styles and up to the present only the chassis has been put out. A few of these are on the road and are being given thorough tryouts so that when the Flint plant is completed the engineers will have fully decided what units will be selected.

ORGANIZE USED CAR EXCHANGE

ROCKFORD, Ill., March 23—Motor car dealers of Rockford, Ill., who have been wrestling with the used car proposition, have decided to form a company and operate a second-hand car exchange. Articles of incorporation have been applied for. The name selected is that of the Rockford Used Car Association. A depot is now being sought and a manager will be engaged. All used cars taken in by members in trade for new cars will be sent to this agency and disposed of. The plan is similar to that in vogue in Elgin and Quincy.

HUGE SALES BY U. S. RUBBER

NEW YORK, March 23—Net profits of \$12,662,110 against only \$492,811 in 1921 are reported by the United States Rubber Co. in its annual statement. The difference in the two years is explained partly by the heavy reduction in inventory costs in 1921. Net sales for 1922 amounted to \$168,786,350, being an increase of \$4,079,729 over 1921.

Alabama Association Uses Salesmen to Get Members

Offers Prize to Commercial Travelers Sending in Five or More Applications

MONTGOMERY, Ala., March 24—Instead of employing field secretaries in its campaign for a larger state-wide membership, the Alabama Automotive Trades Association has evolved a plan which enlists the assistance of every traveling salesman in the state, calling on automotive dealers. Each one of these salesmen is made an associate member of the organization and empowered to receive membership applications.

The association feels that by securing the help of the salesmen it means that there will be from three to ten salesmen calling upon the same man every three or four weeks, and if membership is not secured the first time there are about four chances between now and the semi-annual meeting in Mobile on July 23, when it is hoped the membership will number 1000.

Each salesman will be furnished with a list of the members in good standing by counties for ready reference, with a copy of the by-laws and constitution, and a brief resume of the aims and objects of the association.

To keep the salesmen enthused over the idea, the association is offering prizes to salesmen sending in five applications or more.

Duluth Show Draws Many Visitors From Other Towns

DULUTH, Minn., March 24—The ninth annual automobile show in the Armory last week was more pretentious than ever before and one of the features was the cooperation from the other city of the Twin Ports, Superior, Wis. Walter R. Wilmot, manager of the shows of the Minneapolis Automobile Trade Assn. and at the Minnesota state fair for many years, was in charge of the show here. The exposition was under the auspices, as usual, of the Duluth Automobile Dealers' Assn. Programs were set aside for several cities on the range in which the several mayors took part. Also a large delegation of Twin City distributors were on hand. Duluth has a wide territory to cover in northern Minnesota and Wisconsin, up to the Canadian border and the showing of some 170 models attracted a good crowd of interested prospects, from Eveleth, Virginia, Hibbing, Chisholm and other Minnesota cities.

PLAN ALTOONA SPEEDWAY

ALTOONA, Pa., March 24—Plans for the opening of a new automobile speedway here next September are being made by the Altoona Speedway Assn., which has purchased a site here. The proposed track is to be a mile and a quarter around. G. A. Long is manager of the speedway association.

\$31,070,289 MACK TRUCK SALES

NEW YORK, March 23—Gross sales of \$31,070,289 for the year ended Dec. 31, 1922, as against \$24,849,268 in 1921 are reported by Mack Trucks, Inc., in its annual statement. After the usual deductions, net profits showed \$3,952,279, which, after allowing for regular dividends on the preferred left a balance equal to \$9.94 a share on the 283,108 shares of common of no par value outstanding. After similar deductions and including inventory deductions, the net profits of 1921 were equal to \$1.16 a share on the 109,219 shares of first preferred stock outstanding. After payment of both common and preferred dividends last year there remained a surplus of \$2,532,554, thus increasing the company's earned surplus to \$5,757,799 against \$3,235,245 at the close of 1921.

RECEIVER FOR LIBERTY CO.

CAREY, O., March 24—B. F. Wulff, vice-president and general manager of the Studebaker-Wulff Rubber Co. of Marion, O., has been appointed receiver for the Liberty Tire Corporation of this city, under the State court, following dismissal of a suit in bankruptcy against the company in the Federal court. It is expected that the State receivership will be only temporary and Wulff is authority for the statement that the Liberty company will be merged with the Studebaker-Wulff company if satisfactory terms can be agreed upon with stockholders and creditors. The Studebaker-Wulff company is adding new equipment for the purpose of increasing its production to 1000 tires a day by May 1.

RICKENBACKER CASH DIVIDEND

DETROIT, March 23—Rickenbacker Motor Car Co. has declared a 2 per cent cash dividend which President B. F. Everitt declares is justified by and payable from profits in the first quarter of the year. In January the company paid a 5 per cent cash dividend from earnings in 1922. In its first full twelve months of operation the company has earned \$1.15 a share on its \$10 par value stock or at the rate of 13 per cent.

CANNOT STOP AUTOMOBILES

LOUISVILLE, Ky., March 24—Federal Judge Evans has ruled that automobiles suspected of carrying liquor cannot be stopped and searched without a warrant. The national prohibition act "is not the supreme law of the land," said the judge, and he issued a peremptory order to a federal court jury to exonerate Robert Meyer, the defendant, of charges of illegal transportation of liquor.

MILTON TO DRIVE No. 1

INDIANAPOLIS, March 26—Tommy Milton will carry the coveted No. 1 on the car he will drive in the Indianapolis 500-mile International Sweepstakes, May 30. Milton gets the No. 1 because Harry Miller, the Los Angeles engine manufacturer, has nominated the ex-speedway champion to drive the car he entered on May 31, 1922.

Most Profitable Year for Cleveland Dealers' Association

Peckham Re-elected President for Third Consecutive Term—Other New Officers

CLEVELAND, March 24—G. G. G. Peckham was re-elected president of the Cleveland Automobile Manufacturers' and Dealers' Association for the third consecutive term at the annual meeting which was held in this city last week.

Dan J. Nolan, of the Cadillac agency, was elected vice-president; Herbert Buckman, re-elected secretary, and Robert J. Schmunk, treasurer. The four directors elected at the meeting were: Peckham, Nolan, Birkett L. Williams of the Birkett L. Williams Co., and Warner M. Bateman of the Reo agency. The other members of the board in addition to those named are C. S. Carris, C. A. Forster, O. C. Tyner and R. C. Simmons.

The financial statement disclosed that without any dues or assessments on the members during the year and leaving out amount paid for show space by members, a net profit on operations for the year had been made.

Buckman, who guided the destinies of the organization through what has become its best year, in his annual report directed the attention of the members to the two paramount questions before the industry—used cars and service.

Total Sales of \$26,187,076 Reported by Miller Rubber Co.

AKRON, March 23—Profits before taxes of \$3,116,607 on total sales of \$26,187,076 are reported by the Miller Rubber Co. of Akron for the fiscal year ending Dec. 31, 1922. The Miller company after payment of taxes reports net earnings of \$2,756,607, the company during the year turning a deficit of \$1,290,604 existing on Jan. 1, 1922, into a surplus of \$578,890.

The ratio of current assets to current liabilities is given at more than three to one. Current assets are listed at \$10,585,585 and current liabilities at \$3,146,558.

The 1922 net sales of \$24,764,244 compare with net sales of \$18,983,667 for 1921. This increase in sales was accomplished despite the lower revenue received from tires due to price reductions, and necessitated a substantial increase in unit production.

MITCHELL (S.D.) SHOW APRIL 19-21

MITCHELL, S. D., March 24—The annual automobile show will be held here April 19 to 21 under the auspices of the Mitchell Automobile Dealers Assn. The show, as usual, will be held in the famed Corn Palace.

During the show a meeting of the South Dakota Automotive Trades Assn. will be held and attendance of many dealers from all over the state is expected.

Factories in Indianapolis District Boost Production

Output for First Quarter Much Greater Than for Any Other Similar Period

INDIANAPOLIS, March 24—Indianapolis production of motor cars for the month of March, and for the first quarter of 1923, is far ahead of like periods for the last two years. Although the volume is expected to increase during April and May it is not probable that the present month's percentage of gain over former figures will be surpassed.

Marmon production for March is expected to reach 500 vehicles, with about 35 per cent enclosed cars. The factory reports that it already has orders on hand that will warrant continuing present schedules into the third quarter.

Stutz, now in the third month of producing its new six, will build at least 300 during March, and the factory hopes to reach 500 a month during April and May and to continue through the season at maximum. New dealers and increasing sales in all quarters give confidence to the expectation that demand for the new six will more than keep pace with the production advances planned. The plant has been able to get into production of the new model much faster than was at first expected.

Cole expects to build in excess of 300 during March, and with better receipt of material and parts previously delayed because of rail congestion, during the latter part of the month, hopes to be able to continue production at the rate of 400 to 500 a month. It is said that not only are sales increasing, but that the dealers' organization expands also because of the new "no-trade" plan.

H. C. S. is not yet in production on its new six and present manufacturing is being confined to the four. In April a start on the six schedule will be recorded, and from then on considerable increases in the output will be made for several months.

Duesenberg, with its new assembly and finish structure occupied, and with its equipment about completed, expects to increase its present schedule and to maintain a flow of output about twice the size of last year's records.

National is making fair progress in production, but plans are understood to be well in shape and almost ready for announcement that will step up production sharply.

Should National swing into the expected stride during the next quarter, this city will go considerably ahead of its previous manufacturing records. The National plant ranks about third in capacity of output, and with three other factories more active as a group than they have been for some time in the past, and with one of those makers at double its previous figures, the present year seems bound to set new Indianapolis

Schools Enlisted in Safety Campaign in Texas

HOUSTON, Tex., March 24—The Motor League of South Texas, which is the Houston automobile club, has taken another step toward fastening the principle of "safety first" upon the people of the city and the surrounding country. Through the assistance of the superintendent of public schools an educational campaign for "Safety First" will be conducted. More than 6000 pupils, embracing those of all English classes in the high schools and applied art classes will participate. The subject will be discussed in themes, debates and cartoons and other drawings. The subject will be developed along "everyday lines which means things which could be done and things which should have been done to prevent accidents in connection with driving motor vehicles.

A large number of Houston merchants have offered prizes for the winners in the campaign. The weeding out process of contestants will begin in the various classes of the different schools. The closing of the campaign will be featured by the winners of the various classes and various schools pitted against winners in other schools. Debates will be had and the winning drawings exhibited. Houston automobile club expects to make the closing evening of the campaign the biggest "safety first" gathering ever held in Texas.

oil's motor vehicle manufacturing records.

With the Monroe plant and concern about to enter new hands, another local manufacturing advance will be recorded. It is understood that a new deal for the sale of the Premier is pending, but no details of this can be learned.

Accessory and parts makers and engine builders are also busy with bigger schedules than last year.

PLAN TO BUY PAN MOTOR CO.

ST. CLOUD, Minn., March 23—Some 800 stockholders in the Pan Motor Co. expect to bid in the property at receivers' sale in April. Liabilities of the company are \$500,000, but the syndicate of stockholders believes the property is worth at least \$2,500,000, amount of inventory. If this goes through the stockholders propose to incorporate a new company at \$5,000,000 and elect S. C. Pandolfo president and general manager. A resolution was passed indorsing Pandolfo and expressing the opinion that he is a victim of circumstances.

BRIDGEPORT OWNS LIBERTY

BRIDGEPORT, Conn., March 24—Through a transfer consummated here, the Bridgeport Motor Truck Corp. of this city comes into possession of the plant of the former Liberty Manufacturing Co. on Longbrook avenue, Stratford, Conn. The financial consideration involved is reported as being approximately \$50,000.

Stratton Motors Takes Over Monroe Automobile Company

New Concern Also Said to Be Negotiating for Purchase of Premier Plant

INDIANAPOLIS, March 24—The Stratton Motors Corporation, launched and incorporated here this week, has purchased all the assets of the Monroe Automobile Co. and will continue the manufacture, sale and service of the Monroe here in the "Monroe Division" of the Stratton Motors Corp. The new company incorporated under the new Indiana "no par value" law has a capital of 90,000 shares of no par value common stock and \$500,000 preferred stock. Frank E. Stratton is to head the concern.

It is understood that the new company has also a new small four-cylinder car to sell at a list of less than \$700, which will be manufactured in a separate plant; and that negotiations are under way for the purchase of one of three local plants of ample capacity. It is expected that an announcement of the consummation of a deal for one of these plants will be made shortly.

While his name does not appear in the application for charter, it is known that Frank E. Stratton will head the new company as president. A list of the permanent officers and directors is not yet obtainable. On inquiry, a statement was made that all the officers and directors would be men well known in the industry and that an early announcement of the officials and directors would be made.

It has been known for some time that Stratton has been negotiating for the Monroe and since it became apparent that the deal would be successful, there has been, it is said, a noticeable increase in the sale of Monroe cars, and in dealer interest due to the possibility of acquiring a line that will also include the smaller "Stratton" at a popular price.

Announcement was made some time ago of an impending merger of Monroe and Premier which was sponsored by Stratton. When asked about that proposition, Stratton declined to discuss the Premier situation. The common impression here is that the Premier plant is one of those for which Stratton Motors is negotiating, as it would be ample in size for production of a popular priced four.

MORE TIRE INCREASES

AKRON, Ohio, March 24—Mohawk, India, Swinehart, and American Rubber and Tire Co., have joined the price increasing movement, announcing tire price boosts the same as those of Goodrich, Goodyear and Miller. No announcement made by Seiberling, General or Firestone, although Firestone is expected to increase now. Seiberling is not planning to increase until in May, it is reported.

Whirlwind Show at Denver Conquers March Blizzard

**Three - Day Display Was Largely
Attended and Many Automobile
Sales Were Reported**

DENVER, March 24—Although ushered in by a severe blizzard and escorted out by a still fiercer storm, Denver's three-day automobile show has been declared a success by the unanimous vote of the 101 exhibitors. And this success verdict applies to attendance, interest, actual sales and listing of prospective buyers. The event was staged in the city's Municipal Auditorium, with simple but artistic decorations, and was declared by some of the 15 factory representatives present to be the most beautifully arranged show they had seen anywhere this season.

It was originally scheduled for a full week, but because the dates first decided upon were found to conflict with the city's desire to rent the auditorium for a concert that could not be changed, the show committee cut down the time to three days and four nights—Wednesday night to Saturday night, inclusive. The first blizzard also caused the postponing of an elaborate parade of 100 or more cars planned for Wednesday afternoon to give the show an extra enthusiastic send-off.

This was held the next day, however, and the optimism of the exhibitors was held at high pitch throughout the show, in spite of the fact that an eight-inch snow covering a radius of more than 200 miles in all directions from Denver, with heavy drifts from high winds, prevented a large part of the attendance counted upon from outside the city.

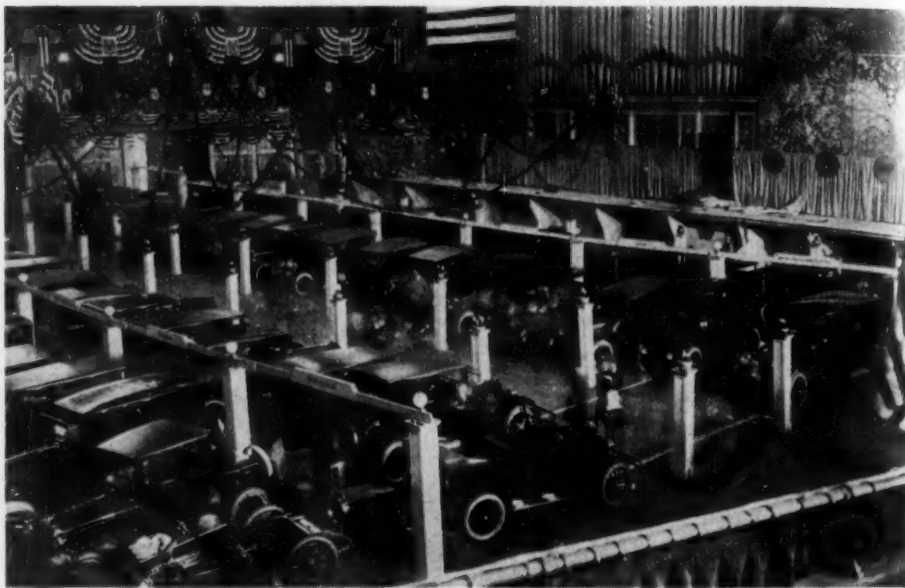
In the realm of actual sales, many dealers claimed that they did not expect any, and some of these reported one or two, which they said came as a surprise. Other exhibitors reported as many as four or five sales actually made on the exhibition floor, and all were highly pleased with the number of substantial "prospects" added to their lists. An unusual percentage of prospective buyers that were not already car owners was also reported. In some cases, enterprising dealers from outside towns persuaded prospective customers to visit the show, and then sold them cars while there.

The dealer attendance from throughout the territory was gratifying to the exhibiting distributors.

The largest attendance for any one day was 11,500, which is about 1500 more than any previous record. Besides the factory representatives, there were visitors from half a dozen states. There were 41 car exhibitors, most of them showing two makes or models each, and 60 accessory booths.

The show was managed by C. M. Hower, with the aid of the following committee representing the Denver Automobile Dealers' Assn.: O. Lewellyn Davis, L. E. Kelton, Myron L. Smith, James H. Naylor, John T. Graham, Fred S. Andrews, and P. A. Jerrue.

View of Denver's Automobile Show



Denver's automobile show this year was held in the Municipal Auditorium and the huge pipe organ shown in this photograph was a great aid in the entertainment of visitors.

COLUMBUS ANNUAL MEET

COLUMBUS, O., March 24—The Columbus Automobile Dealers' Co., the local organization of dealers which has been incorporated, held its annual meeting recently and re-elected all former officers. C. C. Belt of the Belt-Franklin Co., is president; R. H. Mitchell of the Packard-Columbus Co., is secretary; W. F. Moyer of the Oldsmobile Co., is vice-president and A. B. Coates of the A. B. Coates Co., is treasurer. A dividend of 25 per cent was declared following the annual automobile show which was the most successful in the history of Columbus.

HEAVY TRUCKS SELLING WELL

INDIANAPOLIS, March 23—The two-ton truck, the three-and-a-half and the five-tonner have come back in Indiana and all this region. Every dealer and distributor of larger sized trucks reports that business has not been so good in three years. Fully double the sales of last spring, and most of them for much larger units, is the report of every merchandiser of this city. Fleet sales have begun, and the increase in building operations and in construction contracts and road work is keeping every distributor and dealer in the section busy.

HUNTSVILLE (ALA.) DEALERS ORGANIZE

HUNTSVILLE, Ala., March 26—Representatives of leading automobile agencies and dealers here have organized the Huntsville Automobile and Accessory Dealers Association, with a strong membership with W. H. Conner as president; Ed Love, first vice-president; Robt. L. Schiffman, second vice-president; L. G. Edwards, secretary; Louis McCravey, treasurer. Meetings will be held monthly. An automobile show at a later date is one of the plans.

Ford Production Reaches 2½ Times 1922 Two-Month Mark

DETROIT, March 24—Production of 130,577 cars and trucks in February brought the Ford Motor Co. mark for the first two months of the year above the quarter million mark. This figure is in excess of any similar period in the company's history and is two and half times the output in the two months of 1922 which totalled 99,722.

The Kearny, N. J., plant led all others in February output with 12,077. Detroit was second with 9,932 and Philadelphia third with 6,741. The Canadian plant built 6,582.

Tractor production in February was 7,908, four times the total in February last year. For the two months the total is 15,812 as compared with 1,921 in the corresponding period a year ago. Tractor business is taken by the company to indicate the highly improved agricultural position throughout the country.

REO OPENS TEXAS BRANCH

DALLAS, Tex., March 24—A factory branch of the Reo Motor Co. has been established here and the organization is now ready for the selling and distribution of Reo passenger cars and Reo trucks. Following the securing of a long lease on a large building, it was announced that R. C. Langley is president of the Reo Motor Car Co. of Texas; C. A. Triphagen of Lansing is vice-president, and J. J. Coleman is secretary and treasurer. G. A. Langley will have charge of the wholesale department.

R. C. Langley was formerly in charge of the Dallas Buick company. He has been closely associated with the Dallas Automotive Trades Association for years and is considered one of the best posted automobile men in the section. He has a wide acquaintance in Texas.

1923 Good Roads Essay Contest to Close May 1

WASHINGTON, March 26—The Highway Education Board announces that May 1 will be the closing date for submitting essays in the fourth annual contest for the H. S. Firestone four year university scholarship. The assigned subject this year is "The Influence of Highway Transport Upon the Religious Life of My Community."

All students of high school grade are eligible to submit essays, which must not exceed 700 words in length. The essays should be submitted to the school principal or designated teacher with the request that they be entered in the National Good Roads Essay Contest. Full particulars of the contest may be had from the Highway Education Board, Willard Building, Washington, D. C.

Three pupils already have been awarded these scholarships which provide for the payment of tuition and all necessary expenses for four years at any university or college selected by the winner.

Durant to Move Hayes-Hunt Factory to Oakland, Calif.

OAKLAND, Cal., March 26—The plant of the Hayes-Hunt Automobile Body Company, of St. Louis, recently acquired by W. C. Durant and his associates, will be moved to Oakland as soon as a building can be erected to house it, according to announcement here by Durant. A factory for the manufacture of the Flint Six, a new Durant production, also will be established in Oakland within a year, according to the same announcement.

Plans for the building for the body plant, which is to produce closed bodies for the Durant and Star cars, call for a structure of two stories, 80 by 600 ft. and furnishing 100,000 sq. ft. of floor space, and employing 250 persons, says Durant's statement.

Still another car, the name of which has not been selected, but which is to be sold at \$525 f. o. b. eastern factory, is to be added to the Durant line, it was said, and will be manufactured in the present Oakland plant where Durants and Stars are being made. The Pacific coast price of this car will be \$665.

R & V HAS NEW YORK BRANCH

EAST MOLINE, Ill., March 24—The R & V Motor Co. has announced the opening of a New York City branch at 38-40 West 62nd street, the eighth retail branch established by the company which now has offices in Baltimore, Boston, Chicago, Cincinnati, Cleveland, Kansas City and New Haven. J. M. Ryan, formerly with the factory sales department in East Moline but in the last year eastern sales representative with offices in New York City, is in charge. Herbert Conley has been appointed service manager for the branch.

New England Dealers Off to Good Start After Boston Show

Attendance of 41,000 on One Day Sets New Record for Hub City

BOSTON, March 24—Doing a volume of business running well over \$1,000,000 at a conservative estimate the annual motor show held by the Boston Automobile Dealers Assn. was pronounced a success.

All the dealers stated that they were satisfied with results. Some of the distributors handling well known lines did better than a year ago. Others fell a bit behind. But there were plenty of prospects gathered in to insure sales of all the cars that can be secured in the next few months.

That people were interested in motor vehicles was proven by the attendance on Thursday. More than 41,000 people passed the turnstiles. That was a new record for attendance here.

Another thing that pleased the exhibitors was the number of people who came to the show more than once. Salesmen noted people who had been at the show earlier in the week dropping in again the last two days. And in a majority of cases these visitors bought cars.

Two things kept a lot more from buying at the show. One of these was the tax law whereby all owners of machines before April 1 have to pay taxes on them as personal property. When Tax Commissioner Long announced that he was going to have registered lists checked up and make cities and towns collect taxes some motorists sold their old cars, but are holding off taking new ones until after April 1.

Another Resistance Factor

Another factor holding off sales is the class of people who want to sell their old cars before they buy new ones. They feel that they may be able to get more by selling the machines themselves than through turning them in to dealers, now that there is a standard appraisal value for used cars, which the car distributors live up to here.

The meeting of dealers on Thursday was one of the most important show events. There were some 300 dealers on hand from all over New England. They heard Alfred Reeves give some interesting statistics about possibilities of sales in New England. Also he talked about what the makers were doing, predicting a production of 3,000,000 cars for 1923, or nearly 500,000 more than a year ago.

During the show many new dealers were signed up for the smaller territories that had been uncovered. This means a lot of extra orders.

Summed up, therefore, the 1923 show will go down in history as one of the biggest successes in the history of the motor industry in Boston.

Shortage of Labor Proves Worth of Tractor

SAN FRANCISCO, Cal., March 24—Inability to get teamsters, either to drive gang teams on plows, cultivators and harvesters, or to handle wagon trains to and from the stations, has turned the farmers of northern California to the tractor, which, with two men, can do the work of four teamsters and 16 to 20 horses. The result is that the tractor distributors, dealers and salesmen are doing more business in the great interior valleys of northern and central California than ever before. George Moody, head of the California State Free Employment Bureau at San Jose, has just completed an investigation of the teamster situation, and the above is his conclusion.

Charles M. Baer, a tractor agent at Cupertino, in the midst of the northern California farming section, sold nine tractors from January 1 to March 15, 1923, three times as many as he had ever previously sold in the same period.

Midwest Rubber Assn. Looks to Amalgamation with American

CLEVELAND, O., March 24—The Midwest Rubber Manufacturers' Association, at its March meeting here Tuesday, took steps looking toward ultimate amalgamation with the Rubber Association of America. A committee was appointed to ascertain the conditions upon which amalgamation might be effected. The committee was instructed to try to arrange that in case of amalgamation meetings of the western group might continue to be held in Chicago, or some other midwest city, every three months.

Members of the committee are Sidney J. Roy, W. G. Brown of Cleveland, W. E. Wilson of Akron and W. W. Wuchter of Omaha.

At Tuesday's meeting the resignation of Wuchter as president of the association was accepted. He was president last year and recently was reelected, but said he could not give the time to the office for another year. Thomas Follen, president of the Lion Tire and Rubber Corporation of Lafayette, Ind., was elected to succeed Wuchter.

GOOD SHOW AT SAN ANTONIO

SAN ANTONIO, Tex., March 24—Total sales of automobiles made by the various dealers who participated in the eighth annual automobile show, which came to a close last week, were 157 cars, not including Fords, according to a report made by E. A. Wickemeyer, secretary of the show committee.

"This is the greatest volume of business obtained by local automobile dealers in the history of all automobile shows in San Antonio, and is regarded as not only indicating an excellent season ahead, but a record year for the sale of automobiles," Wickemeyer said.

Sales in Detroit for March Are 3060; 314 Over January

**Enclosed Car Sales Exceed Open,
1583 to 1477; Business
Continues to Gain**

DETROIT, March 26—Sales of new cars in Detroit in February was 3060, a gain of 314 over January, according to the report compiled by the Detroit Automobile Dealers Association from registrations in the secretary of state's office. Truck business fell off 47 to 387, the decrease being about equally divided between light delivery and heavy duty vehicles.

In passenger car business enclosed model sales exceeded open by 1583 to 1477, about the same percentage as excess for the same models in January. Every company, with the exception of one or two, shared in the increases, Ford running 91 ahead, Chevrolet 13, with Overland and Star holding to previous totals.

Willys-Knight shows the most marked gain in the medium priced cars with an increase from 20 to 60. Hupp increased from 102 to 164. Jewett doubled previous business. Other leaders in the medium priced field held about equal to the former month. In the high priced field Cadillac led, holding about the same totals as January, as did the other companies.

Ford car business approximated half of the entire sales total for the month, and took 276 of the total 387 truck sales. Ford enclosed car sales exceeded open by 23. In the medium priced field enclosed car sales outnumbered open in most cases. With Hudson-Essex the proportion was 10 open to 92 enclosed. Hupp open car sales exceeded enclosed car sales by 110 to 54. Buick, Dodge and Willys-Knight business was heavily enclosed cars.

Insurance Rates Reduced in San Francisco; New Schedules

SAN FRANCISCO, March 24—Heavy reductions in automobile insurance rates went into effect here March 15, following the issuance of new schedules by the Pacific Coast Automobile Underwriters' Conference. These reductions are made possible by improved traffic conditions, closer enforcement of the laws against speeding, and a general decrease in the number of automobile accidents in this section, notwithstanding the increasing number of machines in use, according to statements by the companies in the conference.

The reductions apply principally to public liability, property damage, and collision risks, and are applicable to all policies on and after March 15, while premiums on all policies written after January 1, 1923, will be reduced, pro rata on the new schedules. Public liability rates on new cars are reduced on commercial cars 10 to 15 per cent, and the same rates apply to property damage. Full-coverage collision premiums are reduced 20 to 30 per cent.

Tire Blowout Causes Death of Man

PERU, Ill., March 24—Joseph Holsinger, 29, proprietor of a Peru automobile transfer line, died here as result of fracture of the skull incurred when a blowout of a truck tire threw him against another car. He was changing tires when the blowout occurred and hurled by force of the explosion his head struck against a wheel of a car nearby in the garage.

CHEVROLET PRODUCTION UP

JANESVILLE, Wis., March 26—Speaking before the weekly luncheon of the Lions Club, Thomas B. Houghton, plant manager of the new Janesville works of Chevrolet, said that production is rapidly reaching the point where the new division will rank second only to the main works in Flint in point of output. By June 1 it is expected that 300 completed cars will be turned out daily, which will represent the maximum capacity so far provided. Reviewing the history of Chevrolet, Houghton said that compared with 255,000 cars produced in 1922, the organization has for its goal an output of 450,000 cars in 1923. The Janesville plant, which put out its first complete car on Feb. 14, was making 75 cars a day on March 15 and 100 a day on March 24, with a March output of 2,500. The April schedule is 4,500 cars, or 175 daily.

FARMERS NEED MORE TRUCKS

NEW YORK, March 26—Need for more trucks on farms exists in 61 per cent of the counties from which reports were received last year in the national survey conducted by F. W. Fenn, secretary of the motor truck division of the National Automobile Chamber of Commerce. In 78 per cent of the counties reporting the preference is for trucks of one and two ton capacity.

The reports were compiled with the assistance of farm and market departments in the various states and the county farm agents in those counties having such agents. The survey covered 1218 counties in 47 states. The number of trucks reported on farms in these counties was 138,308. In 740 counties additional trucks were said to be needed and in 954 counties the preference was said to be for the small trucks.

NATIONAL OFFERS \$3,000,000 BONDS

CHICAGO, March 24—The National Motors Corporation, through a syndicate of New York, Chicago and Philadelphia brokers, is offering a \$3,000,000 bond issue the proceeds of which will be used to provide working capital and refund certain fixed obligations. The bonds will be secured by first mortgage on the corporation's property and will bear interest at seven and one-half per cent. They are due July 1, 1932. They are offered at 98½. Directors of the corporation recently elected Clarence A. Earl as president and announced their intention of acquiring a Detroit plant and establishing headquarters there.

Retail Sales in Milwaukee Improve with Passing of Cold

**Despite Odds, March Sales Expected
to "Stack Up" Better Than
March, 1922**

MILWAUKEE, Wis., March 26—Relief from the most severe spell of wintry weather yet experienced in Milwaukee, even if it proves to be only temporary, has put the retail trade in a better frame of mind over spring business. Huge snowdrifts have been melting away, albeit with some hesitancy owing to a recurrence of storms in a milder form than the "big three" which caused them, and new customers are again asking for deliveries after delaying acceptance of new cars because of fear of damage to mechanism as well as finish.

Superimposed on storms of late February and early March, there came during the week ended March 17 three distinct blizzards, each of record-breaking intensity and precipitation, tying up traffic, interrupting wire communication, delaying mails, and keeping people indoors. In the early part of the past week business men and householders were more occupied with removing drifts than with thinking of the touring season.

Despite these adverse conditions, March sales are expected to average up well, and unquestionably beyond March of 1922, which stood out as the best March in history. Almost every dealer in Milwaukee reports increases. The call for enclosed types is still very good, but with the arrival of spring and more seasonable weather, phaeton and roadster types are wanted. Sport and deluxe models are selling remarkably well even at the premiums over regular open models. Prospects for April business are regarded as excellent.

Sales of automotive equipment are reported excellent. A broad market has been found in the desire of purchasers of used cars to dress these with the latest attachments in order to modernize old vehicles, and make them comparable in appearance with the sport types of 1923. Extreme climatic conditions helped automotive equipment sales make March a record-breaking month.

Richmond Show Closes; More Cars Displayed Than Ever

RICHMOND, Va., March 24—Richmond's eighth annual automobile show closed last week.

This year more cars were represented than ever before and the largest auditorium in Richmond, the Coliseum, was engaged for the exhibition. While the hall holds 3,000 persons with facility, it was crowded six of the eight nights of the show. Last year the automobile show was given in the balcony of the building. This year it filled not only the lower floor but the balcony as well and overflowed into hotel lobbies throughout the city.

Automobile Sales Representative Wins First Prize in N. A. C. C. Educational Essay Contest

Benefits of National Automobile Shows to Public, Manufacturer and the Individual Summarized in Paper Selected as the Best

NEW YORK, March 24—Of the several thousand essays submitted in the contest inaugurated in December by the National Automobile Chamber of Commerce to bring out the value of national automobile shows to the public, the manufacturer of motor cars and the individual, the paper adjudged the best was written by E. Phil Merrill, special sales representative of C. H. Wills & Co., Marysville, Mich.

The winners of the other two watches offered by the N. A. C. C. were W. W. Hodge, formerly connected with Hodge Bros., motor transportation engineers of Worcester, Mass., and Charles Alma Byers of Los Angeles, a well-known contributor to the motoring publications. The awards were made by S. A. Miles, Harry Melxell, H. R. Cobleigh and John C. Long, all executives of the N. A. C. C.

As Merrill summarizes the questions, the value of the national shows to the public is as follows:

First: Educational — learning about their own car or improvements made on different cars.

Second: Opportunity for comparative values under one roof, which means time and effort saved.

Third: Benefit from competition, in raising the standards of design, workmanship, materials and performance of the cars.

Fourth: Meeting factory representatives and the opportunity of taking up personally any grievance or trouble.

Fifth: Interchange of experience and service among owners.

Sixth: To provide everyone with a wholesome and beneficial entertainment.

The value of shows to the manufacturers is summed up as follows:

First: Educational—To study the trend

of the industry and to educate its organization, both factory and field.

Second: Incentive to improve product by comparative display. To raise the standard of their product:

Third: To sense the demand of the public, and keep their business on a profitable basis.

Fourth: To feel the pulse of the trade from contact with others in the industry.

Fifth: To provide means for expansion by increasing their organizations in the field, in obtaining new distributors and dealers.

Sixth: To increase the confidence and enthusiasm of its entire organization, both factory and field, as well as the public.

Seventh: To improve its business methods toward the public, both sales and service.

Eighth: To gain publicity, practically country and to some extent world wide, and thus increase its clientele.

Ninth: To actually sell cars to new prospects and assist its distributors and dealers in making sales.

As to the value of shows to himself, Merrill, who is well known in all parts of the country through his lectures on Wills-Sainte Claire constructional features at automobile shows, writes:

First: Educational—to learn about improvements and advancements made in the industry.

Second: To improve my salesmanship and increase my value to my company as well as to myself.

Third: To receive a yearly supply of inspiration and enthusiasm and confidence in our product.

Fourth: To help my company and the industry in upholding its reputation and standing by my conduct toward the public.

Fifth: To broaden my acquaintance with the big men of the industry and improve my opportunities.

Sixth: To meet the public and obtain a better idea of its requirements and experiences.

Murphy, though he had previously announced his acceptance of a place on the Durant team, resigned to drive one of the two new Miller specials, the other of which will be handled by Tommy Milton. Dario Resta, who also resigned from the Durant team, will be seen, according to announcements here, with Ralph de Palma and Joe Boyer in the new Packard racing team. Elliott replaced him on the Durant list.

ELECTION AT QUINCY, ILL.

QUINCY, Ill., March 24—A. P. Nesta was reelected president of the Quincy Automobile Trades Assn. at the annual meeting and the other officers are: R. C. Taylor, Ray Lee, Walter Ebbert, A. E. Newberry, Carl Grant, T. Elmer Jefferson, Morris Adler and C. J. Wells, vice-presidents; C. Lawrence Wells, treasurer.

Opposition to Gas Tax Is Voiced by Virginia Dealers

Endorsement for a \$50,000,000 Bond Issue for Better Roads Is Favored

RICHMOND, Va., March 24—Resolutions opposing the three-cent gasoline tax bill now before a special Good Roads Session of the Virginia General Assembly were adopted here at the annual meeting of the Virginia Automobile Dealers Association.

Resolutions indorsing a \$50,000,000 bond issue for good roads and favoring a state-wide referendum on a bond issue if General Assembly does not indorse it, were adopted.

James A. Kline, of Richmond, was re-elected president of the organization. Vice-presidents elected were as follows: A. B. Crowell, Danville; J. H. Handcock, Lynchburg; R. G. Edgerton, Norfolk; V. P. Hawse, Harrisonburg; Dr. Frank D. Cooper, Roanoke; J. C. Temple, Petersburg, Va.

H. M. Figgatt was re-elected secretary and Russell H. Rawlings treasurer. Both are of Richmond. Almost a 50 per cent increase in membership, the largest in many years, was reported. The attendance was one of the most representative which has ever been the case since the formation of the body.

General prosperity and better conditions throughout the State were reported by the president in his annual address.

Yellow Cab Publishes House Organ; Woodruff Is Editor

CHICAGO, March 24—The Yellow Cab Manufacturing Co. has commenced the publication of a monthly house organ called the Yellow Cab and Coach Journal. It is edited by Harvey Woodruff, a Chicago newspaper man.

One of the leading articles in the first number, just out, is headed: "Never Has Automobile Industry Awakened to Fact That Cab Business Needs a Specially Constructed Vehicle." Following is an excerpt from this article:

"Little did John Hertz and Paul H. Geyser, president and vice-president of the Yellow Cab Manufacturing Co., realize in 1912 the future of what they then considered a disappointment. For it was in that year they awakened to the fact that the automobile manufacturer was not interested in developing the cab business.

"The automobile manufacturer practically ridiculed the ideas of these men that the cab business required a specially constructed vehicle for its service. But no automobile manufacturer had the vision or the inclination to listen to these men and in sheer desperation Mr. Hertz and Mr. Geyser decided that they must of necessity build a cab themselves or else let the industry go along with vehicles in no wise adapted for success in this line of transportation."

Earl Cooper Takes Jimmy Murphy's Place on Team

SAN FRANCISCO, Calif., March 24—The vacancy in the Durant racing team caused by the sudden and unexpected resignation of Jimmy Murphy, has been filled by Earl Cooper, according to announcement by R. C. Durant, organizer and financial backer of the team. The new team, consisting of four pilots, driving cars powered with the new 122-cu. in. engines, replacing the present 183-cu. in. engines, will be seen for the first time at the 500-mile Decoration Day race at Indianapolis. As now listed, the team will consist of Cooper, Frank Elliott, Harry Hartz and Durant himself. This is virtually 100 per cent representation of northern California, since Cooper, Hartz and Durant are from San Francisco and Oakland.

It is generally understood here that

Fiat to Be Tried on Yank Market, Says Rome Report

Gran Uff. Agnelli, Chief Official of Fiat in London, Seeking New Finances

ROME, Italy, March 3—(By Mail)—Plans for the exploitation of the American market for the Fiat car are being made by officials of that company, according to the "Auto Italiana" which cites as its authority the fact that Gran Uff. Agnelli, chief executive of the company, is now in London seeking new finances for the company, and Ing. Fornaca, technical director of the company, is in the United States, making a study of that market.

Rumors that the company is in financial straits have been denied by officials of the company who stated that the purpose of Ing. Fornaca's visit to the United States is not for new capital, but is to visit a large number of American motor plants and study the processes and methods adopted by them.

The Lingotto plant in Turin of the Fiat company is now being modernized and the daily output is to be increased from 65 to 200 cars. Production of this magnitude cannot be readily absorbed in Italy, the "Auto Italiana" points out, and declares that the extension of the Fiat selling program "in the United States would be but natural."

Pierce-Arrow Distributors Hear Firm's Progress Told

BUFFALO, N. Y., March 23—Distributors for the Pierce-Arrow Motor Car Co., representing territory from coast to coast, met here early this month and at a dinner listened to an address by Myron E. Forbes, president of the company. Forbes predicted unusual business prosperity for his company this year. He told how sales of Pierce-Arrow passenger cars increased in the last six months of 1922 until the total for that period was 70 per cent greater than the total for the first six months of the year.

A census of "oldtimers" was taken before the banquet commenced. Half of the number present in the dining hall arose when Chairman Fassett of Philadelphia asked for those distributors who had been with the Pierce-Arrow Company for 15 years. Fifteen had been with the motor concern 20 years, while eight had served for 25 years, and two for 26 years. Charles Sheppy, present chief engineer of the company, who constructed the first Pierce-Arrow automobile, had served 27 years.

Forbes told of the new Pierce-Arrow policy. He said that efficiency was higher, the product was better, overhead expenses had been slashed until the differences were enormous, which in total would enable the concern to place a larger quota of automobiles on the market than any year hitherto.

HIGHER CAR PRICES IN FRANCE

PARIS, March 8—(By mail)—There is a general tendency toward an increase in the retail price of all automobiles on the French market, the amount of the increase varying between 5 and 10 per cent. The explanation is the increased cost of raw material, caused by the low production of the blast furnaces. The decreasing value of the franc on the exchange market also tends towards a rise in car prices. Fiat has jumped the price of its 10 h. p. model 1500 francs because of the lower value of the franc compared with the lira. There is an impression that the rise in prices is likely to continue during the year. An increase in tire prices is expected almost daily, in view of the fact that rubber and cotton are rising while the value of the franc is dropping.

Goodyear, Goodrich and Miller Announce 10 Per Cent Increase

AKRON, Ohio, March 24—Tire prices were increased for the second time this year by three of the major companies in the Akron district Monday. The Goodyear Tire and Rubber Co., B. F. Goodrich Co., and Miller Rubber Co. all announced 10 per cent price elevations on pneumatic automobile tires to become effective early next week. Tube prices also are increased but no change is made for the time being on prices of truck tires.

The first of the year all tire companies boosted prices from 10 to 12 per cent. This second increase, officials claim, is necessitated by the higher cost of labor in Akron and the steadily increasing cost of crude rubber which has increased in cost over 150 per cent since last November. Miller, Goodyear, Firestone, and Goodrich all have given 10 per cent bonuses to their employees instead of making flat wage increases.

BRITISH SEEK HIGHER TARIFF

LONDON, March 24—A higher tariff against American-built automobiles is being urged on the House of Commons by workmen employed in various motor factories throughout the country who are being thrown out of employment due to competition in the local market with low-priced American-made automobiles.

Manufacturers Agitated Over the Subject of Prices Again

Many Believe That They Will Have to Increase Because of Material Costs

DETROIT, March 24—Most manufacturers are again agitated over the subject of prices. It is the expectation in some quarters that increases will become necessary within a short time because of rising material costs. It is asserted that the larger production companies would be forced to make advances immediately if their output were curtailed for any reason.

Most companies are practically certain to make price increases on individual models which cost so much to turn out that there is no profit in them at the present price. Some of these advances probably will be disguised by the addition of certain equipment and other companies will gain the same result by discarding some of the regular equipment.

Those companies which have contracts for materials which were placed some time ago when prices were lower will be able to continue at the present list until these contracts expire.

While it often is asserted that buying is heavier on a rising than on a falling market, manufacturers assert they will not increase prices unless it becomes absolutely necessary.

California's Highways Show Total Mileage of 75,889

WASHINGTON, March 24—Census of California's public highways, just announced by the Bureau of Public Roads, shows a total mileage of 75,889 miles, of which 44,775 miles are improved highways, and 14,275 are surfaced or paved. The per capita income for highways in 1921 was \$14.50, or \$655 for each mile of road.

Figures for Missouri roads, also announced by the Bureau, give that state a total mileage of 111,521 miles, of which 46,311 miles are improved road, and 7,880 paved or surfaced. The per capita income for highways in 1921 was \$4.85, averaging \$148 for each mile of road.

Many Old Timers Among These



When these Pierce-Arrow distributors congregated recently at the factory and gathered around the festive board it was found that half of them had been with the Pierce-Arrow company 15 years or longer. Fifteen had served the company 20 years, eight counted 25 years of service and two 26 years.

BUSINESS NOTES

The Chicago offices of the Heil Co., manufacturer of truck equipment, have been moved from 2718 Wentworth avenue to 2422 Cottage Grove avenue. The new service and salesroom has three times the floor space of the old offices. The home office of the Heil Company has also announced a change of address of the New York distributing station. The Motive Parts Corp., Heil distributor in New York territory, has moved from 136 West 55th street to 796 10th avenue, near 53rd street. The H. P. Wilson Co. of Denver, Colo., has recently been engaged as the Heil distributor in that district.

Moon Motor Car Co. directors have voted to retire the 3,114 shares of Moon Motor preferred stock now outstanding at \$105 per share on March 31. It was also announced that the regular quarterly preferred dividend of 1% per cent, payable April 1, 1923, has been declared.

The Marshall Electric Co. of Chicago, originator of the Marshall system of constant potential charging for storage battery service stations, will move its office to St. Louis March 26, opening on the second floor at 3225 Locust street. Harry B. Marshall, formerly of St. Louis, is president of the company, D. P. Ruger of Chicago is vice-president and Thomas Marshall of Chicago is treasurer.

The Springfield Simoniz Co. has been formed in Springfield, Mass., as a branch of the Simons Mfg. Co. of Chicago. Similar branches will be opened shortly in Hartford and Worcester.

Tungsten Spark Plug Co., St. Louis, Mo., has been incorporated to manufacture and sell spark plugs and other automobile equipment and accessories.

The Carnegie Auto Paint & Trimming Co. of Cleveland, O., has been chartered with a capital of \$10,000 to decorate and trim motor vehicles

by E. R. Dolin, L. M. Laurienzo, M. Carvey, John F. Wilson and K. J. Fatica.

The Wheeler Co. is the new name of the Continental Tool & Supply Co., 122 North Senate avenue, Indianapolis, Ind. The change was made after the old company purchased the W. R. Wheeler Co. The concern acts as manufacturers' agent for tools and automobile specialties.

Charles W. Price, formerly sales manager of Tuthill Sales Co. of St. Louis, has purchased the Mohawk Mfg. Co. of Peoria, Ill., manufacturer of three speed transmissions for Fords, and is moving the company to St. Louis.

The Automotive Gear Works, Inc., recently moved from Atlanta, Ga., to Richmond, Ind., where it occupies a new building.

DeLuxe Automobile Co., Oldsmobile distributor in St. Louis, has started publication of a weekly house organ called "Oldsmobile Pep Sheet." It goes to all the company's employees and dealers.

A new steam generating plant representing an investment of \$150,000 or more has been placed in commission by the Kissel Motor Car Co. at Hartford, Wis., providing much-needed additional capacity required for the operation of both the passenger car and motor truck divisions.

The General Motors Truck Co. has established a direct factory branch in Milwaukee at 447-449 Jackson street, under the management of H. L. Gillette, who has been sales manager of the General Motors Truck Co. of Wisconsin, a local corporation heretofore handling Wisconsin wholesale and retail business.

The B. F. Sturtevant Co., Boston, has purchased for \$100,000 the entire plant of the defunct Wisconsin Engine Co. at Corliss, Wis., near Racine, and will establish a western production center employing from 500 to 600 men.

use. The resulting annual saving to users of automobiles is declared to be approximately 1000 times the entire cost of the tests.

CAR IMPORTERS ORGANIZE

NEW YORK, March 23—The Foreign Automotive Association, Inc., an organization of importers of automobiles, has been formed for the purpose of effecting closer co-operation among the importers, to the end that the foreign automobile can be presented most advantageously to the American public. Although the association has just got under way, seven European manufacturers have joined, representing Fiat, Benz, Renault, Voisin, Panhard, Lanchester and Hotchkiss.

The association has opened headquarters at 150 West 57th street, where J. C. Willcox, secretary, is located. The following officers have been elected: President, H. G. Baran (Benz); vice-president, J. H. Stelling (Voisin); treasurer, J. Vinton Locke (Hotchkiss), and secretary, J. C. Willcox (Fiat). The organization has already secured Hotel Astor as the place to stage its first Salon.

TO ORGANIZE U. S. TRUCKS

NEW YORK, March 24—At the request of the United States Government the National Automobile Chamber of Commerce and the Society of Automotive Engineers will reorganize the motor truck department of the Postoffice which, it is said, is sadly in need of scientific management. There are 4000 trucks operated by the Postoffice and it is felt that Uncle Sam is not getting 100 per cent efficiency out of them. The N. A. C. C. and the S. A. E. will make a thorough investigation of the service and recommend a scientific plan of operations for routing, dispatching, service and maintenance.

Iowa Sales Increase After Show; Used Car Sales Also Up

Sale of Used Cars Will Not Bring Increase in Price, Say Des Moines Dealers

DES MOINES, Ia., March 24—After-the-show sales in this territory have more than lived up to expectations. According to the records of the local Motor Trades Bureau, new cars have been turning rapidly. The spring-like weather of the first weeks of March is held responsible for a marked increase in used car transactions. Despite the better market for these, there has been little increase in prices. One dealer asserts that used cars will show little or no increase in price this spring. He holds that higher prices for used stock would mean inflated values and that new car dealers are now regulating their trade-in allowances to meet the actual selling value of the car.

Tire and accessory dealers report a good volume of business during the first two weeks of March with a slight tendency to slump since the winter weather has again set in. Tire repair men are enjoying a better repair business than for some time. This is attributed to the higher prices of new tires, causing the car owner to have his old tires repaired.

Spring shipments of tires from the local tire branches to tire dealers of the state outstripped those of last year by large figures. The higher prices of tires seems to have stimulated the tire business. Some tire men are doubtful as to how the public will take further increases in prices. Some fear another buyer's strike if tires go much higher.

MOTOR TRANSPORT SURVEY

WASHINGTON, March 23—Representatives of the automotive industry this week attended executive sessions of the steering committee of the United States Chamber of Commerce, which is arranging a nation-wide study of the transportation system. It was announced that the selection of various committees had not been completed.

The survey of the field of motor transport will cover the relationship of highway transport to rail and water carriers. It will embrace facts and figures on comparative sums invested in highway construction, railroads and waterway facilities and equipment. The tentative plan for the inquiry into motor transportation has not been completed and will not assume definite shape until this special committee is assigned to work.

MOON MAKES BIG RECORD

ST. LOUIS, March 23—Sales of the Moon Motor Car Co. in February were greater than the company's combined sales for the first five months of 1922, it is announced by Stewart McDonald, president.

New Orleans Association Takes In Automotive Trade

NEW ORLEANS, March 23—The Automobile Dealers' Association has extended its membership to include every branch of the automotive trade in New Orleans, and has opened a campaign for members. Garage, service station and battery men, and salesmen of automobile dealers are being received into the membership as the result of a changed policy brought about since the election of A. H. Borden, president of the Shuler Auto Supply Company, as president of the New Orleans Automobile Dealers' Association.

Borden has declared that the interests of the entire trade in this city and territory can be advanced best by a solid organization of the diversified business of the industry. Joseph L. Ruhl, vice-president of the United Motor Car Co., Peerless and Hupmobile dealer, heads a committee named by President Borden to make New Orleans solid for the association.

LINING TESTS SAVE MILLIONS

WASHINGTON, March 24—Claims have been advanced by officials at the Bureau of Standards that tests of automobile brake linings will save automobile users \$10,000,000 or more each year.

These tests consist of wearing out samples of different kinds of lining, under conditions which permit definite comparison of their useful lives. The manufacturers are said to be much interested in the tests and have made use of the results in improving their manufacturing methods, with the result that all the standard makes have been improved by amounts varying from 100 per cent under ordinary conditions to as high as 400 per cent under conditions of severe

CONCERNING MEN YOU KNOW

Charles W. Schroeder, proprietor of the Schroeder Tire & Vulcanizing Co., DePere, Wis., died at the Green Bay hospital following an operation. He was 55 years old.

N. B. Stevens of Akron, O., has been appointed manager of the Syracuse, N. Y., branch of the Firestone Tire Co. He has been with the Firestone organization for six years, having been special representative and assistant to the manager in the northwest district with Minneapolis as headquarters.

R. E. Brown of the Fisher Body Corp., Detroit, has been appointed to represent the Society of Automotive Engineers on the Consulting Committee of the Lumber Standardization Conference.

George M. Graham, vice-president of the Chandler Motor Car Co. in charge of sales, service and advertising, was elected a director of the company at the annual meeting in Cleveland, March 14.

S. deB. Keim, general sales manager of Rolls-Royce of America, Inc., announces the appointment of W. L. Drake as works representative for the Middle West.

Harry C. Beaver, treasurer of Rolls-Royce of America, Inc., has been elected vice-president of the Western Massachusetts branch of the National Metal Trades Assn.

Louis A. Faverio, for some time in charge of service for the Bisbee Motor Co., Greenfield, Mass., has been appointed director of sales for the R-K Mfg. Co., automotive specialties manufacturers, New York.

E. B. Collins, for two years manager of the tire and equipment division of the Dallman & Cooper Supply Co., Fond du Lac, Wis., has resigned to accept the position of sales manager of the Hathaway-Buick Co., Oshkosh, Wis., which recently completed a new \$50,000 sales and service building.

H. C. Snyder, for eleven years city superintendent of schools and principal of the high school at Stevens Point, Wis., has resigned in order to engage in the automotive sales and garage business.

J. W. Meiklejohn, a pioneer dealer of the northwest, and mayor of Waupun, Wis., has

retired from active participation in the business of J. W. Meiklejohn & Son Co., due to advanced age. His son, John Meiklejohn, who has been engaged in the trade in Los Angeles for several years, has returned to Waupun to assume the active management.

E. D. Gibbs resigned as advertising director of the B. F. Goodrich Co., effective April 1, to open New York office as special advertising and sales counsellor. Formerly he was advertising manager of the National Cash Register Co. and president of the Associated Advertising Clubs of the World. No successor has been announced by Goodrich.

E. E. Blackwell has been added to the sales and engineering force in the automotive field by the Morse Chain Co., with headquarters at the Detroit plant. He will concentrate on Ohio and Indiana. For the past eight years Blackwell has been with the Champion Spark Plug Co. of Toledo.

A. L. Cash has been appointed general manager of the Canadian Products Division of General Motors of Canada, Ltd., with headquarters at Walkerville, Ont.

Harry Fosdick, who was one of the first five dealers in Boston, dating as far back as the Mobile steamer, has resigned as manager for Paul Le Bardy, Marmon dealer in Rochester, N. Y., returning to Boston as manager of retail sales for the Sills-Chevrolet Co.

George A. Crittenden, at one time Chandler dealer in New England, has joined the staff of the Lovejoy Hydraulic Shock Absorber Co. in the capacity of eastern sales manager.

H. C. Gillespie has been appointed manager of the Buick Motor Co. branch in Memphis, Tenn., succeeding George Gillespie.

G. C. Jernigan, 32 years old, vice-president of the Automotive Electrical Service of Memphis, Tenn., died recently from pneumonia.

Charles D. Hazard, 65, for 16 years representative of the International Harvester Co., at Rock Island, Ill., died suddenly, following an attack of apoplexy. Failing eye sight four years ago caused him to retire from active business. His son, L. H. Hazard, is production manager of the Velie Motors Corporation, Moline, Ill.

High Priced Car Sales Increase in New York City

NEW YORK, March 23—Sales of new passenger cars in the Metropolitan district showed an increase of 366 in February over January, according to the Automobile Sales Analysis published by Sherlock & Arnold, the gain being among the higher priced cars.

For the two months of this year, total sales of new cars reached 6396 as against 4800 in 1922 and 2247 in 1921. Among the low and medium priced cars, two makes led the field with sales greater than 1000, with three following above the 200 mark. There were seven others that made sales in excess of 100.

With the higher priced cars, two were far in the lead with more than 200 sales, while the remainder trailed far behind with sales of less than 50 to their credit. A recapitulation for the two months of this year follows:

| | Medium and low priced | High priced |
|----------------|-----------------------|-------------|
| January | 2,814 | 291 |
| February | 2,801 | 580 |
| | 5,615 | 781 |

CHEVROLET BRANCH AT DALLAS

DALLAS, Tex., March 24—The Southwestern branch of the Chevrolet Motor Co., a division of the General Motors Corporation, will be located at Dallas. The company has closed a ten-year lease on a new four-story building which will house the plant. Work on the building

has begun. It will be completed and occupied by June 15, it is announced. The Southwestern branch has been located at Fort Worth for several years. Recently it was closed and arrangements were being made to sell it. It is understood the sale will not be made at once. The Chevrolet company paid \$174,000 for the ten-year lease on the new building here.

FORD GETS RIVER POWER

WASHINGTON, March 23—The Federal Power Commission has granted a preliminary permit to the Ford Motor Co. to develop power at the high dam erected across the Mississippi river between St. Paul and Minneapolis by the Government as an aid to navigation. Ford has four months in which to complete and file with the commission his plans for the project. Ford will pay the Government a reasonable price for the permit.

ST. PAUL, Minn., March 5—Henry Ford has told the Greater St. Paul Committee that the St. Paul Ford plant will be his largest manufacturing unit west of Detroit. The new plant will begin with one unit which will produce 700 cars each eight hour day and parts for 1000 cars in the same period. Between 4000 and 5000 men will be employed at the start, of which number 3000 will build cars and the others parts. This staff will be increased year by year until the maximum of 15,000 is reached. Ford will employ surplus farm labor in winter.

"Smallest" 12-Cylinder Engine in Car Entered for Grand Prix

Delage Product in 122 Cu. In. Class Has Bore of 1.6 In. and Stroke of 3.5 In.

PARIS, March 4 (By Mail)—A 12-cylinder 122 cu. in. engine will be used by Delage in the French 500-mile Grand Prix road race at Tours on July 2. This is believed to be the smallest 12-cylinder engine ever built, for with the 122-in. limit its bore and stroke are brought down to 42 by 90 mm. (1.6 by 3.5 in.).

Louis Delage states that modern experience has proved the superiority of the multi-cylinder engine over the four for racing under the limited piston displacement rule. By increasing their number and reducing their size, the weight of reciprocating parts is lessened, the engine can run at a higher number of revolutions, and the danger of breakage is considerably decreased. As the builder of a six-cylinder passenger car, Delage is not in favor of a straight eight, and in his opinion a double six has advantages, for racing purposes, over a straight six.

The Delage racing engine is a V-type with the two blocks offset, so as to allow the connecting rods to be mounted side by side. Camshafts are mounted in the head and operate two valves per cylinder. The engine is declared to develop its maximum power at 5,500 revolutions a minute. Normal lines are followed in the construction of the chassis. Total weight of the car is 1430 pounds. Rene Thomas will drive the Delage in the French Grand Prix.

COX COMPANIES MERGE

ALBANY, N. Y., March 23—The Cox Brass Mfg. Co., Ltd., maker of Cox bumpers and other automotive products, has been merged with the Cox Bros. Mfg. Co., Inc., at a combined capitalization of \$300,000. Hereafter the combination will be known as the Cox Bros. Mfg. Co., continuing the manufacture of bumpers.

No change has been made in the personnel of the company, which has been in business since 1872, establishing a second factory in Cleveland in 1919. The officers are: President, William G. Cox; vice-president and treasurer, Theodore M. Cox; secretary, George E. Way, and directors, John C. Watson and John Cox.

WORKING FOR LIEN LAW

SYRACUSE, N. Y., March 24—Five hundred members of the Onondaga County Garage Owners Assn. are urging the passage of a law which will permit garage owners to levy liens against automobiles for unpaid repair bills. The action was taken unanimously and petitions are now being circulated so that every garage owner in this part of the state will be officially behind the legislation which is endorsed by the New York City Garage Owners Assn.

IN THE RETAIL FIELD

R. B. Hyatt Motor Co. has been opened here at 422 So. Tryon street, Charlotte, N. C., to handle Peerless cars.

The Barrow-Chevrolet Co. of Columbia, S. C., has been chartered with a capital stock of \$25,000.

T. B. Laney has sold his interest in the Secret Motor Co. at Monroe, N. C., and has organized the Laney-Gordon-Chevrolet Co. Laney and Craven Gordon will be in charge.

Theodore L. Dodd & Co., 80 East Jackson Blvd., Chicago, with a branch office in the General Motors Bldg., Detroit, have been appointed western sales representatives of the Titusville Forge Co. of Titusville, Pa.

The Ary Motor Sales Co. of Xenia, O., has been chartered with an authorized capital of \$10,000.

The Kissinger Motor Co. of Columbus, O., has been incorporated with a capital of \$10,000 by E. R. Kissinger and others. It is located at 51-57 E. Goodale street. It will handle Kissel cars.

The Scott-Bradford Co. of Mansfield, O., has been chartered with an authorized capital of \$30,000 to buy, sell and deal in motor vehicles.

The Milwaukee branch of the Miller Rubber Co. has been moved from 359-361 East Water street to new and more commodious quarters at 452 Milwaukee street. W. E. Probst is branch manager.

Gill Bros., Madison, Wis., will build an \$80,000 garage and service building, 100 by 120 ft., three stories, at Webster and Butler streets.

The Fox River Chevrolet Co. has been incorporated at Appleton, Wis., with \$50,000 capital by O. M. Kloem and L. A. Craig to represent the Chevrolet and conduct a garage and service business.

Jerome Terwilliger, Dodge dealer at Beloit, Wis., has admitted William O'Connell of Janesville, Wis., as a partner with a half-interest. Mr. O'Connell is Dodge representative in Janesville and will retain this interest, supervising the Beloit sales department as well as that in Janesville.

The Hegg Auto Co., Stevens Point, Wis., has been incorporated with \$25,000 capital by J. E. Hegg, Herman Pagel, Jr., and P. C. Johnson, who have conducted a sales and service business, dealing in the Nash and LaFayette, for some time past.

The Hamernik Motor Co., Chevrolet and Moon dealer, Fond du Lac, Wis., has plans for a 60-ft. extension to its sales and service building to handle growing volume.

The Lee Host Buick Agency, Lake Geneva, Wis., has purchased the garage and service building of L. M. Traver & Co., who will occupy the former Host garage until a new structure can be erected.

The Hilbert (Wis.) Auto Co., owned by A. H. and A. J. Schmidt, is enlarging its service department in order to handle general repairs and replacements in addition to the usual service on Ford cars, which it will continue to represent exclusively.

Arthur Volkman, Beaver Dam, Wis., has been appointed Paige and Jewett dealer succeeding E. H. Peshak.

C. H. Gumbert, formerly of Sioux City, Ia., and T. B. Null of Waupun, Wis., have formed the partnership of Null & Gumbert and established a general automotive service business in connection with the salesrooms of the Prison City Motor Co., Waupun, Wis.

E. H. Ramm, Ford dealer, New London, Wis., has disposed of his branch house at Clintonville, Wis., operated as the Service Auto Co., to a local syndicate headed by A. C. Haase, who will be president and general manager.

The Northern Motor & Supply Co., Stevens Point, Wis., has been reorganized following the retirement of M. M. Ames as president. H. C. Snyder is retiring as city superintendent of schools to become president and active manager. R. A. Whittaker has been elected vice-president, and William Gumz, secretary-treasurer.

The Thon-Turner-Lanigan Garage Co., Wausau, Wis., has changed its corporate title to Thon Garage Co.

The Wisconsin Stoughton Co., Milwaukee, has been incorporated for \$25,000 to take over the state distribution of the Stoughton truck, heretofore handled by a direct factory branch.

The Green Bay (Wis.) Nash Co. has taken over the building adjoining its sales and service headquarters at 404-410 Adams street to provide more adequate sales and office facilities.

A. H. Williams, Waterloo, Ia., has been named manager of the Cadillac Company at Dubuque, Ia., according to announcement by officials of the company this week.

Edward Burnshaw, Jr., formerly general manager and treasurer of the Philadelphia distributorship of Peerless cars, has engaged in business for himself under the name of the Burnshaw Motor Co., dealer in Lincoln and Ford cars and Fordson tractors, at 2037 Market street, Philadelphia.

The Franklin Motor Car Co., Reo and Apperson representative in Richmond, Va., has placed an order with a local architect for an up-to-date automobile building, to be erected this spring.

Platte City Motors has been incorporated at Platte City, Mo., to deal in motor vehicles.

Richardson Motor Co. has been incorporated at Nevada, Mo., to do a general automotive business by L. F. Richardson and others.

Ward Lederer of the Springfield (Mass.) Durant Co. and affiliated companies in that vicinity, has returned from a Pacific coast tour and is perfecting arrangements for the distribution of the Flint in his territory.

Jacob Stone, formerly with Bland's Auto Exchange, has opened a store for the sale of used cars in Springfield, Mass.

J. S. Harrington, Inc., now has its large new service building in operation in Springfield, Mass., affording admirable accommodations for Hudson-Essex users.

Armstrong-Carter Chevrolet Co. has opened a new Chevrolet store at 600 Madison avenue, Memphis, Tenn.

The Chattanooga Drive It Yourself Co. has been incorporated at Chattanooga, Tenn., to rent automobiles to users.

The Studebaker Automobile Agency at Memphis, Tenn., will occupy new quarters at 253-269 Monroe avenue, where alterations are under way to prepare the building for the company's use. Quarters now occupied at 335 Monroe avenue will be retained.

Bids for the erection of a new building to be occupied by the John T. Fisher Motor Co. of Memphis have been asked for. The new building will adjoin that at present occupied by the Fisher company and will be an addition to its space.

Sheft Auto Parts Co., 309 Jefferson avenue, Memphis, has started in business.

Burt-Overland Motor Co. has been organized in Memphis, Tenn., by W. T. Burt and Dan Pope to sell the Overland and Willys-Knight cars. Sales and service quarters on an extensive scale will be at 631 Monroe avenue.

Union avenue, in Memphis, Tenn., along which many automotive stores are located, is to have a white way, the first link being from Main to Marshall avenue.

E. Gray Smith, 1505 Broadway, Nashville, Tenn., has been appointed Packard distributor for Nashville, parts of Tennessee and Northern Alabama. He has been selling high grade cars for 12 years.

Broadway Motor Co., 1400 Broadway, Nashville, Tenn., recently staged a special showing of the various Studebaker models, the hours for reception of visitors being from 10 a. m. to 11 p. m. Music and dancing were provided.

Kelser & Brophy, Kalamazoo agency for the Chevrolet line, will soon have a new plant right on Kalamazoo's automobile row. A building, two stories high and 66 by 160 ft. in dimensions, of fire-proof construction, is to be erected for them on one of the best sites in the city. The same agency now has two sales and service stations in Kalamazoo.

Connell & McKone Co., for twelve years New England distributor of Overlands, has opened salesrooms at 700 Commonwealth avenue, Boston, and will handle the Flint exclusively.

W. L. McConnell has taken over Locomobile sales in New England, which formerly were handled by a factory branch.

The Billburg block at Rock Island, Ill., known in the pre-prohibition days as the "longest bar" in the world, has been leased by the McKibben-Carter Motor Corp. for salesroom and service station. The firm is now located at 1708-1710 Third avenue, where it has territory agency for the Stutz and Moon cars.

Barish Bros., Sioux City, Ia., dealers, have opened a Linn County branch for distribution of the Chevrolet car, at 626 Second avenue, Cedar Rapids, Ia.

Among new automobile agencies formed recently in the Southeast are the following: Cooper Motor Co. of Conway, S. C.; Dothan Buick Co. of Dothan, Ala.; Read & Randal Motor Co. of Miami, Fla.; Banner Motor Co. of Durham, N. C.

Henry B. Fargo, Geneva, Ill., has approved plans for a modern garage at 305 State street and expects to commence construction about April 1.

The Tri-City Motor Car Co. has been organized at Granite City, Ill. It is proposed to operate a first-class garage and sales agency at 18 C street. Capital stock has been fixed at \$35,000.

The Talbot-Barry Motor Car Company, Decatur, Ill., distributors of Ford cars, has leased an adjoining building at 335 East Prairie street which will be used as an assembly and storage room and machine shop, doubling the previous floor space.

J. C. Dawson & Sons, Streator, Ill., have broken ground for a modern garage at 205 North Bloomington street. The structure will have a frontage of 50 ft. and depth of 150 and will be two stories. The Dawsons have been engaged in other lines and this will be their debut in the automotive field. They are now deciding upon the lines of cars to be handled.

M. W. Barrenche, Rockford, Ill., has opened a used car exchange at 119 North Winnebago street and will specialize in Fords.

S. A. Henry of the Nebraska Buick Auto Co. of Lincoln, Neb., has taken charge of the G. M. C. motor truck sales in southwestern and central Iowa. He will have headquarters with the Des Moines Buick Co. at Des Moines.

C. A. Rockwood, well-known Des Moines, Ia., tire man, has moved to larger quarters at 1121 Locust street. The business will be known in the future as the Rockwood Tire and Battery Service.

George A. Peak, Des Moines, Ia., has been appointed distributor for Auburn automobiles in central Iowa. The firm name will be Auburn Des Moines Company. Quarters have been obtained at 1218 Grand avenue. The King-8 will be handled in addition to the Auburn.

W. W. Spieth has returned to Des Moines after a year's absence to take charge of Hupmobile service for the Central Iowa Motors Co.

The Consumers' Auto Supply Company, Dubuque, Iowa's newest wholesale house, is being managed by Joe Jungwirth and Adolph Kochendorfer. The firm will do general business in accessories.

The Cameron Automobile Co. has been organized in Dallas for the purpose of handling and distributing the Durant and Star automobiles in North Texas. The company is composed of R. L. Cameron, P. G. Cameron, P. T. Pegues and R. C. Rochelle.

The Filgo Motor Company of Fort Worth, Tex., has added the Gray car to their lines and will be distributors for this car in the Fort Worth territory.

J. A. Treadway, for the past eight years active in automobile industry in Texas, has been named salesmanager for the Rose Motor Co. of Dallas. He will have charge of the sales forces for the Chevrolet in the Dallas district.

The Durant and Star cars in the Fort Worth, Tex., district will be handled by the Reynolds-Gregg Motor Co., organized for that purpose.

The establishment of the Southwestern branch of the Reo Motor Car Co. in Dallas was announced this week with the leasing of a three-story building for a long term of years.

George F. Mulkey, former Fort Worth automobile man, has been named distributor for the Hupmobile in the Lubbock, Tex., district.

G. A. Rudy has been appointed the Canton, O., dealer for the General Motors Truck Company of Pontiac, Mich.

The Central Motor Sales Company of Dayton, O., has been appointed a distributor for the General Motors Truck Company of Pontiac, Mich., in that territory.

The Watson-Buick Auto Co., Ogden, Utah, has opened a branch house in Brigham City. It will be located in the Morgan building. Ira Heaton will be in charge of the branch.

ELECTRICAL SERVICE DISCUSSED

SPRINGFIELD, Mass., March 23—At a two days' conference of the service managers' committee of the National Automotive Electrical Association in Hotel Kimball, March 1 and 2, new problems and projects related to equipment and servicing were considered. Earl E. Turner, Cleveland, manager of the association, presided. Following the main discussion the committee members were guests of the Westinghouse and American Bosch companies at a dinner in the Noyasset Club, and the following day they paid inspection visits to these plants.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Magneto to Replace Battery and Generator on Tractor

Q—We intend to install a magneto on a tractor that is now equipped with battery and generator. Advise what size gear will be necessary to drive the magneto. The gear that drives the generator now has 24 teeth and turns $1\frac{1}{2}$ crankshaft speed. What size gear will we need on the other end of this shaft and on magneto to gear it right speed?—I. C. Young, Anselm, Neb.

1—The make of the tractor has not been mentioned in your communication, but we assume that the 24-tooth gear is the third gear of a train from the crankshaft. This would give the 24-tooth generator shaft gear the same rotation as the crankshaft. It would be also apparent that the crankshaft gear would have 36 teeth in order to develop the $1\frac{1}{2}$ ratio. In order to secure the right magneto armature speed it will be necessary to install a gear smaller than the magneto driven gear on this generator shaft.

For a four-cycle, four-cylinder engine using a two-spark conventional magneto the armature shaft speed should be the same as the crankshaft speed. The gears best suited for installation on the shaft and on the magneto shaft can be determined only after you have carefully surveyed the layout, including the distance between the generator drive shaft and the outside of the crankcase. The number of teeth required is optional as long as the ratio of 1 to $1\frac{1}{2}$ is retained.

If installation necessitates a gear not larger than, say, 4 in. in diameter, with 10 teeth, it will mean that the magneto armature shaft should carry a gear having 15 teeth. The fewer the number of teeth on the magneto drive gear, the coarser will be the allowable adjustment on the teeth, and for this reason it is advisable to fasten the drive gear temporarily to the generator driveshaft and then set the magneto to the engine before permanently pinning or keying the gear to the generator driveshaft. Manufacturers of magnetos carry in stock outfits which are applicable to many of the present generator installations and we would advise that you communicate with any of these leading firms, as it is probable they have gears that will fit.

A READER SUGGESTS

We take pleasure in helping to answer Mr. Emil F. Karel's questions as to generator trouble described in the Dec. 14, 1922, issue of MOTOR AGE.

In your answer it was suggested that oil was getting into the generator and then onto the commutator so that the

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

brushes became oil soaked. We have found the same trouble in generators that bolt directly to the timing gear case. Our method has been to put on a tin oil thrower back of the gear and on generators that have a return oil passage into the gear case we fit a piece of metal over the hole so as to allow the oil to flow out but prevent any quantity of oil from splashing in and interfering with the draining action.

We have also overcome condensation in these generators by drilling a $\frac{1}{8}$ -in. hole in the top near the end so as not to interfere with the field windings. We no longer have trouble with ball bearings wearing out when we use these methods.—A. D. Stuehm, Peotone, Ill.

MOTOR AGE wishes to express appreciation to Mr. Stuehm for his co-operation and interest in sending in this possible solution of the trouble experienced by Mr. Karel.

Oil Dilution and Replacement

Q—I have had a great deal of trouble with unsatisfied customers who complain of the oil I am selling. This oil, however, is a standard make very much advertised and supposed to be very good. I find, however, that it gets very thin after running from 500 to 1,000 miles, and sometimes a heavy sediment collects in the bottom of the crankcase. How will it be if I mix one-quarter of a pint of castor oil to one gallon of mineral oil in a Studebaker special six?—Edward C. Daigle, Marion, Iowa.

The kind of oil you are selling is doubtless as good as any on the market and the trouble is probably due to the fact that your customers do not replace the oil with sufficient frequency. The manufacturers now recommend that the oil be entirely replaced every 500 miles. The necessity for this lies in the crankcase dilution which takes place in cold weather due to gasoline that works down past the pistons into the crankcase.

You should explain this to your customers and tell them that no oil can give proper lubrication when it is diluted with gasoline and that it is economy in the long run to replace the oil every 500 miles.

In regard to the use of a certain percentage of castor oil in with the mineral oil, would say that this is a matter of opinion. On Ford cars a small percentage is sometimes used with the idea that it will tend to prevent chatter of the brake bands. On other cars, however, no such requirement exists. Castor oil does have the property of becoming very thick when it is cold, and consequently does not flow very well until the engine warms up. In winter this is a disadvantage rather than an advantage.

TO CLEAN A FORD OIL LINE

A very good way to clean out a Ford oil line is to take an old Johns-Manville speedometer cable and put it in an electric drill. Remove the radiator and front cover of the gear case and all things necessary to get at the pipe at the front end. Also remove the sloping door of the transmission. The drill will very readily twist the cable from the front up the bend to the other end, where someone can take hold of it and work the cable back and forth several times. This can be done, no matter how tightly the oil pipe is clogged up.—A Reader, Joliet, Ill.

Architectural Service

IN giving architectural service, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

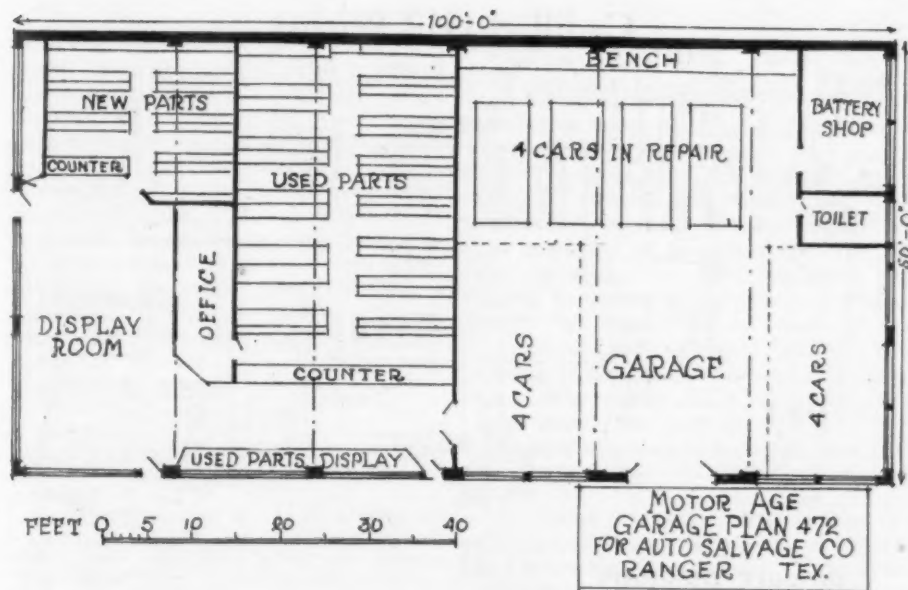
Number of men employed in repair shop.

How much of an accessory department is anticipated.

Shop Proportions Are Important

Q—We herewith enclose you plans of the floor of a new garage we are constructing. Will you please send us plans that will give us the most room also make handling of parts and repair the most economical.—Auto Salvage Co., Ranger, Texas.

We have changed the proportions of the shop from 40 by 50 ft. to 50 by 50, as a 50-ft. shop is an off size, too large for one row of cars and not large enough for two. In this way there is storage room for six or eight cars and also re-



pair shop room for four cars beside the battery room. Unless you can have some windows above the bench, it would be advisable to place two skylights between the trusses on this side, in order that there may be plenty of light for the repair shop.

A better and more condensed arrangement of parts would be as we show them

rather than on shelves around the wall. Used parts are always rather messy and dirty and this disposition would keep them out of sight and at the same time handy and arranged so that all can be found in an instant. New parts should be kept by themselves so that customers will have confidence that they are getting new parts when they ask for them.

ACCOUNT IS VALID WITHOUT NOTES

Q—Two months ago my partner sold a car to a very good friend for \$300. This friend paid him \$200 cash and was to pay the balance whenever he could. At the time of sale the title was also given out A giving any notes whatever to us, of the debt being on the title, and without A giving any notes whatever to us, leaving us without any proof that there was a debt on the car. Two weeks ago A sold the car for \$140, giving the title to B, second purchaser. B came to claim the car showing us the title and explaining the transaction. We told him there was still a debt on the car. He engaged counsel, who advised him that he had a clear title as long as we had no notes. We have not yet turned the car over to B.

1—Your claim is against A, personally. Neither promissory notes nor any other kind of writing is necessary to give you the right to proceed against him for the balance due on the purchase price. Under certain conditions and sales, a writing is necessary under the universal Statute of Frauds, but otherwise your word or oral testimony may establish the contract.

When you sold the car you passed title, whether there was a writing or not, or whether notes were given, or part cash paid and credit extended for the balance. Your own word is evidence that there was a debt created in your favor in the sale of the car. If your statements are disputed, then it is left to a court or jury to say whether you have proof. You will see that a writing is only superior to word of mouth in that the writing

may be an admission against the other party.

Let us repeat that B's title does not depend on "notes." From your statements, you passed title to A, giving him credit for the balance due, and A had the right to resell the car immediately thereafter. With nothing more, you have no right to withhold the car from B, who bought without any notice of claims against the car.

You do not say how you came into possession of this car. Your state gives a lien for storage, repairs and accessories furnished. If you have such charges, they would be superior to the claim of B, provided he purchased subsequently to your claim for charges.

There are two methods used in preserving the seller's claims against automobiles sold, until the price is paid. One is to take back a mortgage on the car sold and have it recorded, and the other is to draw up a conditional sale contract and record this contract. The recording act makes such public record constructive notice to all the world of the seller's claims. Unless you proceed in this manner your transaction is no more than any other sale. Suppose you buy a pound of coffee or a garden rake on credit at your dealer's. Of course, you get title to these, and the dealer may only sue for the price.

The same rule applies to the sale of automobiles. Hence the good business man will protect himself by the mortgage

(usually accompanied by payment notes, as agreed upon) or by a conditional sales contract, and he will see that they are properly executed and recorded. And the wiser business man will go further than this by requiring that a purchaser on time carry fire, theft and liability insurance for his protection in case of such loss.

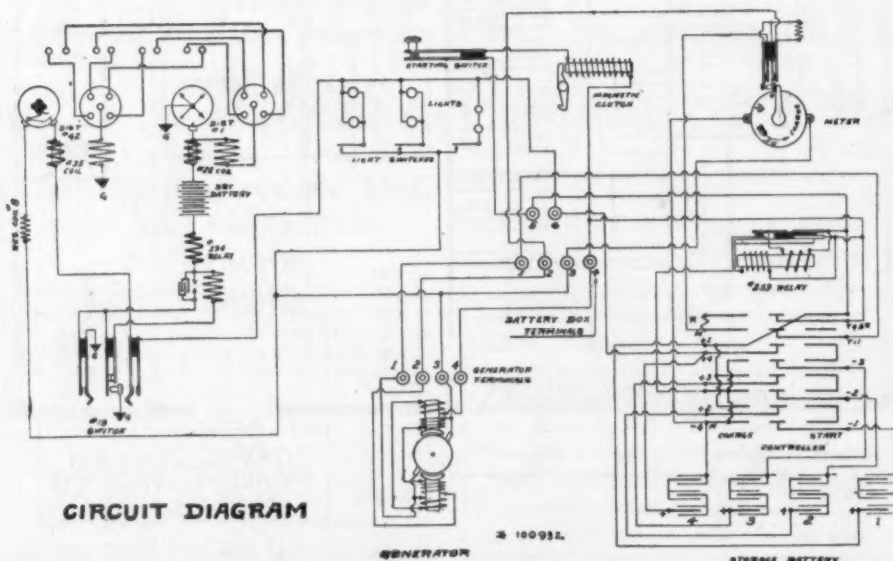
The sales slips, or your books of account, are evidence of any charges owing you.

2—We have five cars on storage on which storage charges amount to nearly \$100 apiece. The owners of the cars never show up, and never answer our letters asking them to make some kind of a settlement for the debt due. The cars in question are not worth more than \$15 apiece, for three of them, and the other two are worth about \$25 apiece. This is a very good estimate. How can we seize these cars, as we need the space for other customers? We would also like to know the lien laws of Maryland for repairs on cars.—Maryland Reader.

2—You have a lien on the cars for storage. Now we think your best remedy would be to bring suit for the storage against each owner. Then you can sell the cars under the judgments and apply the proceeds to the debts, the judgments being good for the balances due from each of the owners.

You have a lien for furnishing storage, for accessories, and certainly for repairs on automobiles in Maryland, and you have a right to retain possession of cars on which such lien exists until your charges are paid.

Cadillac 1912 Wiring



Q—Supply wiring diagram of 1912 Cadillac showing connections on battery-starting switch and magnetic latch.—Ren Spatz, Meckling, S. D.

The circuit diagram is shown in accordance with your request. On old Cadillac cars it is sometimes deemed desirable to use the motor generator as

a generator only and then use a 6-volt battery. This makes possible a very much simplified circuit and we accordingly send you by letter page 49 of the November 30th, 1922, issue of Motor AGE, which gives this diagram as it is possible that your copy of this issue has been mislaid.

CAUSE OF JAMMING NOISE

Q—We have an Oakland, 1919 model, in the shop for repairs. This car has a sort of jamming noise somewhere in the transmission. This noise can be heard only when the engine is warmed up and when descending a hill or going over rough places in the road with the gas partly shut off, but it runs fine going up a grade where the engine is pulling. When the engine is cold we cannot hear any noise.

We have put in new blocks in the universal joints, front and rear and have examined the gears and they do not seem to have any more play than is needed. We found, however, between the clutch and the gears, two washers on the main drive gear shaft that are loose and also four holes in the shaft that have no bolts or taper pins in them. Could they have been lost out, or are these holes intentional? We have looked for this trouble three times but we have never found anything that helped, so far, and would like your advice if you have anything to suggest.

1—The holes you mention are intentional and do not require any bolts or taper pins. We are not sure of a solution of this problem, but would suggest that you check up the rear axle, as noise in the axle is sometimes transmitted up to the transmission and may even sound like trouble in the engine. It is possible that some gear is loose on the shaft.

Another possibility is that the engine does not hit evenly, due to poor carburetion when idling or when under a light load, and this may result in missing, which exaggerates any condition of looseness in the transmission or rear axle. We would accordingly suggest your checking up on the engine when idling to see that it runs smoothly.

2—We have a Maxwell engine that we intend using for shop engine and would like to know if it is possible to use the generator as a source of ignition current by using a Hot Shot battery to start on and switching over to generator for running. Would it be advisable to use one or two bulbs so as to use up some of the current or would it be a practicable scheme either way?—Homer B. Johnson, Jackson, Ohio.

2—The generator cannot be used in this way unless you also connect it to a storage battery to absorb the excess current. Without a battery the voltage will vary with the engine speed and will usually be high enough to burn up the ignition coil or burn out the points. If bulbs were used in an attempt to use the excess current they would be correct for only one speed. Below that speed they would use current that the ignition coil should have and above that speed they would be in danger of burning out.

If you are interested in connecting up the whole system so as to have a battery on the line, would refer you to page 43 of the Dec. 7 issue of Motor AGE, where a diagram is given for connecting up a Maxwell motor generator in a simple manner.

WHY A DISCHARGE READING AT AMMETER?

Q—Explain how and why we get a reading of discharge at the ammeter when the current flows directly from the battery to the starting motor.—Gerald F. Hoffman, Princeton, Ill.

The reading you get is probably not due to the starting motor current itself.

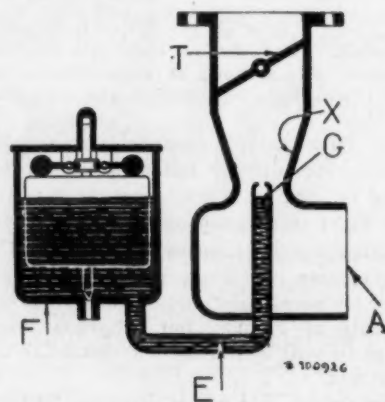
On most cars battery ignition is used, and before stepping on the starter switch you turn on the ignition. Current flowing to the ignition coil usually goes through the ammeter and it is probably this current that gives the reading you see.

BASIC PRINCIPLE OF CARBURETERS

Q—Explain the basic principles of a carburetor in the next issue of Motor AGE or by letter.—George Podlosch, New Britain, Conn.

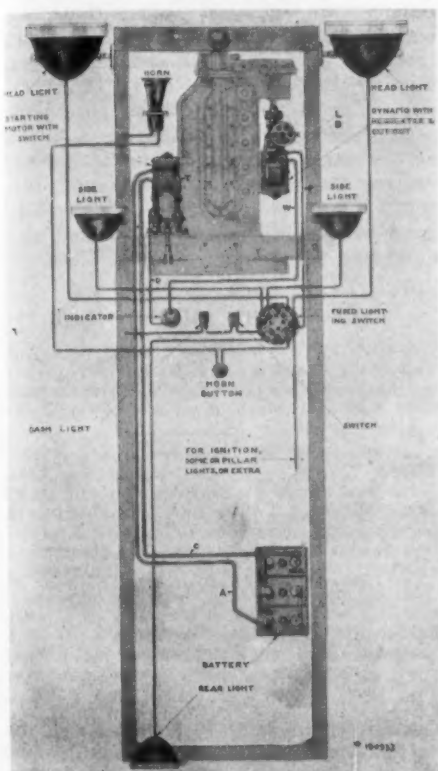
We have illustrated a simple type of carburetor taken from a Zenith instruction book. Any carburetor is a device for properly evaporating gasoline and mixing it with the right proportion of air. The carburetor principle is somewhat similar to the action of a railroad train, when it rushes past the station and draws a column of air after it. This is noticed by the old newspapers which blow along the track after the train. Somewhat similar is the action in the carburetor where a rush of air passes through and sucks the gasoline along with it.

In our illustration the gasoline float chamber is marked F and the gasoline level is maintained by means of a float which, as it rises, operates a needle valve and closes the opening so that too much gasoline cannot enter. Gasoline passes through the connection "E" to the jet "G". Here the gasoline level is maintained at a point just a little below the opening so that the gasoline will not leak out and be lost when the car is standing. The valve "T" is similar to the damper in a stove pipe and regulates the amount of mixture which can go to the engine and accordingly regulates the engine speed. The air nozzle "X" is sometimes called a venturi and air coming in at "A" goes up through the passage "X" and sucks with it gasoline vapor from the jet "G". The throttle valve "T" is of course open a certain amount.



This is the principle of a simple carburetor. At high speeds however, the suction is greater than at low speeds and has the effect of drawing up too much gasoline in proportion to the air. This is one of the things that necessitates the seeming complication in various carburetors, but these are needed in order to give the right mixture at all speeds.

Timing of 1920 Chalmers



Q—Send valve timing diagram of Chalmers C-35, 1920.

1—Valve timing diagram for this engine is not necessary. The only data given out by the factory is that the exhaust valve closes at 10 degs. past upper dead center. Measured on the average size flywheel, 10 degs. will equal approximately 2 in. It is advisable while checking the valve timing to refer to the flywheel marks, which will give you the exact position of the exhaust valve closing. The recommended tappet clearance is .003 of an inch with the engine warm.

2—Supply wiring diagram of Partian Palmer, 1915 model, with Gray & Davis starter and generator and Atwater-Kent ignition.—G. W. Quann, Rhoadesville, Va.

2—Wiring diagram covering the 1915 Partian Palmer car is shown. Although this diagram is not intended particularly for the Partian Palmer car, it shows the general wiring scheme of the models S & T Gray & Davis equipment which was used on this car.

REGULATING FORD GENERATOR

Q—We cannot get a Ford generator regulated so that it will charge about 10 amperes. It will either charge 20 or none at all. It begins charging when the engine is running slowly, and as soon as the cutout points close it charges heavily. Moving the third brush a very short distance will not cause it to charge between these two points, but it will jump from one to the other.—A Missouri Reader.

One possibility is that the third brush has been moved at sometime without first loosening the third brush clamping nut. This in most cases injures the fibre rocker ring. We accordingly feel that when you move the third brush back

from the 20-ampere point that you caused it to become grounded which of course prevents the generator from charging at all. Normally there is one main brush grounded and the other main brush is connected to the live terminal. The field winding is also connected from the ground brush to the third brush. It is possible that there is some trouble in the cutout but we would not worry about this until the other condition is corrected. If you can hold the cutout points closed by hand and get the generator to operate properly it is then time enough to check up the cutout.

FORD STARTING MOTOR AS POWER FOR HOIST

Q—We would like to rig up a hoist on a truck to lift one end of a two-ton load and a body weight of about 400 pounds. We would like to hook up a Ford starter as power, using a 6-volt, 15-plate battery. Would the battery stand it and how much of a gear reduction would be necessary to lift this load?—A. D. Stuehm, Peotone, Ill.

Such an installation would not be advisable. It is not an impossibility, but from our figures, requires three gear reductions. Gear reduction from the pinion on the starting shaft to a large ring gear similar to the kind used on the Ford flywheel. This ring gear would have to be mounted on a shaft, preferably on ball bearings, and this shaft would have to have another small 10-tooth pinion like on the starter shaft. This 10-tooth pinion would have to mesh with a 70-tooth gear on a third shaft. On the third shaft you would need another 10-tooth pinion meshing with a fourth gear which would also have about 70 teeth. This last gear would be on the shaft which carries the drum which would wind up the chain or rope which lifts the weight.

It would be very nearly essential to have all of the shafts mounted on ball bearings. It would then be necessary to have a cleverly designed ratchet arrangement of some sort on the starter shaft to make sure that the load would never get away from you and drop. If this ever happens it would spin the starting motor at an enormous rate of speed and throw it into a thousand pieces.

By the time you would make up all the special gears, bearings and shafts you would spend two or three times as much money as a well-designed hoist would cost.

We like, however, to see originality such as is expressed in this question, and it was quite an interesting job figuring out the problem. As far as the starting motor and battery are concerned, the job is easy, as it is the equivalent of working the starting motor and battery for about one minute to lift a 2,400-pound load three feet. The difficulty lies, however, in the cost of constructing the various gears, shafts, bearings, hangers and similar pieces needed.

Valve Timing and Coil Testing For Buick D-45

Q—Give us correct valve timing for a Buick D-45, in degrees.

1—The exact valve timing is not available, but you can easily check the valve action by watching for the marks on the flywheel. If you have the front of the crankcase open you can check the timing by means of the punch marks or letter "O" marks on the teeth of the crankshaft and camshaft gears. The closing of the exhaust valve should occur after dead center when the piston has gone down from 1/32 to 1/64 in.

2—Give best method for testing out Delco ignition coil on Buick D-45—C. W. Ordel, Philo, Ill.

2—About the easiest way to test out this coil is to have it in place on the car and connected up normally. Turning on the ignition switch carries battery current not only to the ignition coil but also to the motor generator field and armature. If the small wires on the motor generator, that is, the field and armature connections, are disconnected, then turning on the ignition switch will give battery current to the ignition coil only. You can now take off the distributor cap and disconnect the center wire which leads from the ignition coil to the distributor cap. This is the high tension wire and the end of it should be held within 1/8 or 1/4 in. of the engine or frame of the car.

You can now turn on the ignition switch and, with the high tension wire forming a spark gap, you can operate the interrupter contacts by hand, opening and closing them with one finger or with a pencil. If the spark will jump 1/16 of an inch every time the circuit is broken, the coil is probably O. K., but if the spark will jump only 1/32 in. or so it shows the coil to be defective. About the only other possible cause of trouble would be a burned condition of the interrupter contacts where the surface material of platinum or tungsten has been burned away so that the iron itself is making contact. This would require new points.

MOTORCYCLE MAGNETO NOT SUITABLE FOR CAR

Q—We have a 1913, model 31, 5-passenger Buick car on which we wish to put a Bosch magneto. The magneto in question was used on a 45-degree twin-cylinder motorcycle. State what changes will have to be made in the Bosch magneto to adapt it to this four-cylinder engine.—J. E. Murphy, Spokane, Wash.

We do not believe the idea is practicable. The best thing you can do is to sell the magneto and buy one suitable for the car. As it stands, the magneto delivers only two sparks instead of four, so that the cam would have to be changed. A different type of distributor and distributor cap would also have to be used, and in the long run the expense would probably be greater than the cost of a good magneto of suitable type.

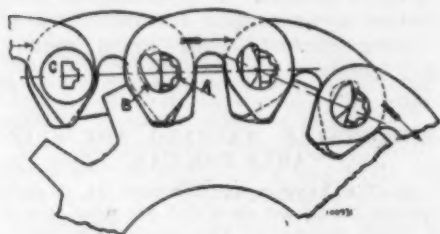
Replacing Cadillac Timing Chains

Q—We have a model K. K.-57-90 Cadillac with the crankshaft to camshaft chain also the camshaft to fan chain very loose. Advise if there is an adjustment to take up these chains and if so send diagram. Otherwise give instructions for installing new chains.—E. J. Morgan, Evart, Mich.

When chains become excessively loose it is necessary to replace with new ones. To do this, the front cover plate of the engine crankcase should be removed. This requires removing the headlamps, radiator and fan. The oil pump elbows should also be disconnected from the crankcase. Next remove the cap from the front engine support and remove the splash shield under the engine. Remove the bolts connecting the exhaust pipe to the manifolds on the engine. Block the car so it will not roll on the floor and carefully jack up the front end of the engine. Disconnect the pipe at the air pump. Remove the cap screws holding the front cover plate to the crankcase of the engine and draw the threaded dowel pin. Remove front cover.

To remove the camshaft driving chain, cut out the riveted head of one of the seat pins on the camshaft driving chain and remove the seat pin and rocker pin. To remove the fan shaft driving chain, the camshaft must first be removed. Cut off the riveted head of one of the seat pins on the fanshaft driving chain and remove the seat pin and rocker pin. Remove the fanshaft driving chain.

When installing the fanshaft chain care must be used to have the arrows on the chain pointing in the direction it will run. If installed the other way it will quickly destroy the chain. Bring the ends of the chain together, preferably on the larger sprocket. Insert pins and rivets. It is unnecessary when installing a fanshaft driving chain to pay any attention to relative positions of the



Cadillac timing chain construction

sprockets upon which the chain operates, but the ignition must be retimed after both chains have been replaced.

If the fanshaft driving chain has been removed it will be necessary to replace it before replacing the camshaft driving chain. In replacing the camshaft driving chain care must be used to see that the chain is so placed on the sprocket that the valve timing is correct. One tooth of the camshaft driving sprocket "A," in one of the illustrations we are showing,

is marked with an arrow and the tooth diametrically opposite with an "O." A tooth on the crankshaft sprocket "B" has a similar arrow upon it and the two teeth opposite each have an "O" mark.

Turn the camshaft and crankshaft to bring the sprockets into the position shown in the illustration. The arrows on the two sprockets must point toward each other and the tooth of the camshaft sprocket marked "O" must be directly opposite the space between the two similarly marked teeth on the crankshaft sprocket.

Without turning either of the sprockets, place the chain on the sprocket with the arrows, which are stamped on

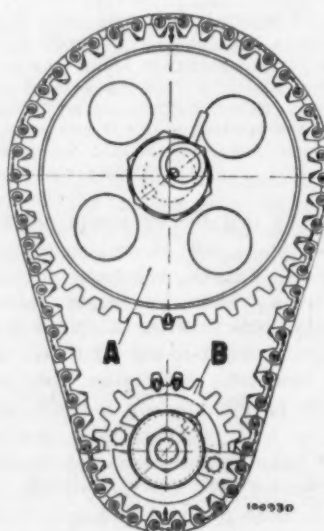


Fig. 43. Crankshaft and Camshaft Sprockets and Chain.

Cadillac 57 timing chain

the outside links, pointing in the direction in which the chain is to run. If the chain is so placed on the sprocket that it runs in the opposite direction, it will quickly destroy itself.

Referring now to the other illustration, which shows the chain construction, it will be seen that each joint of the chain contains two pins; a seat pin "A," which is ribbed, and a rocker pin "B," which is plain. If a chain is removed, be very sure in replacing it that the joint pins are inserted as shown. Bring the ends of the chain together on the larger sprocket. Insert the rocker pin and a used or extra seat pin to align the link. Clamp the new seat pin in a vise and rivet the small washer "C" on one end.

Force the used seat pin out by inserting the new seat pin. Insert the new seat pin from the rear. In doing so, be careful not to force out the rocker pin. Be sure to recover the used seat pin so that it will not get into the mechanism of the engine.

After the new seat pin is in place, turn the engine so that the connection is midway between the sprockets. Then

insert a riveting block between the crankcase wall and the inner end of the seat pin to be riveted, place the small washer on the end of the seat pin and carefully peen over the end of the pin. Remove the riveting block. If, in installing a chain, the rocker pin is inserted backwards it will cause a knock on the small sprocket which will quickly destroy the chain. It is absolutely essential that the joint pins be assembled correctly if the chain is to live and give quiet and satisfactory service.

TESTING THE SHUNT FIELD

Q—We have a Northeast model D motor generator from a 1918 Dodge car. This machine will not generate more than one-half volt, although it operates O. K. as a starting motor.

After taking the machine apart it was tested for ground and opens on both fields and armature and found to be O. K. We took voltage drop across the adjacent commutator segments, using a millivoltmeter, and found no variation of sufficient amount to indicate any armature trouble.

After clearing the ground in the commutator and the brush assembly, we reassembled the machine and tested it as a motor with a six-volt battery connected from the main terminal to ground. On this test it motored freely and drew 7 amperes turning clockwise from the drive end. With the battery connected to the field end of the field fuse clip (fuse removed) it drew 5 amperes, but turned counter-clockwise, facing the drive end.

We then removed the generator field leads and installed it on the car, with the result that it would generate only one-half volt. Was this wrong? If reversing the field leads was right, then what is the cause of the trouble?

1—Reversing the field leads was wrong. When you connected the live battery wire to the field end of the fuse clip you were running current through the shunt field in the reverse direction to the way it normally flows. This reversed the magnetic effect of the field and consequently reversed the direction of rotation.

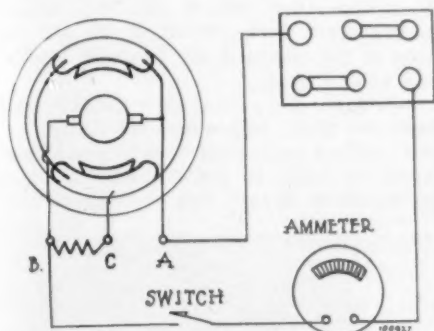
A better way to test the shunt field would be to connect the battery from the main terminal to the frame of the machine and then, with the generator operating as a motor, snap the fuse in and out of its clip and see if a spark is obtained. This would show that you had shunt field current. It might also be well to check the machine for motoring, both with the fuse out and with the fuse in place.

2—Is the voltage drop test a conclusive test on an armature?—Illinois Reader.

2—It is better to supplement this test with a growler test and while making the growler test it is well to use a pair of phones and make connection across adjacent commutator bars. A buzzing noise will be noticed and if this is the same all the way around it shows the armature is O. K., but if at some pair of bars the noise is unusually loud it shows an open circuit. This is also usually indicated by a burnt condition of the commutator bars. The growler test, of course requires alternating current unless a good vibrator is used in connection with a storage battery.

Wiring of Ward-Leonard Dynamo

Q—We are figuring on using a Ward-Leonard automatic dynamo to charge batteries and would like to know what voltage this is, also would like to have diagram of wiring as original wires were removed. We want to use this system without a cutout. This is dynamo unit



No. 4824, type B. L.—Paul Johnson, Danvers, Ill.

Your purpose is not entirely clear from your letter as you say you wish to charge batteries and at the same time you refer to original wiring which we assume was on some car. We however, find no record of any such dynamo as you describe being used on a car and it is possibly a larger machine on which we have no information.

The chief feature however, of Ward-Leonard generators has been the voltage control by means of a vibrating regulator. We are accordingly illustrating a generator such as would be used with a regulator of this kind. It has one terminal which we will call "A" which is common connection for armature and field. It has another terminal "C" which is the other end of the shunt field and a third terminal "B" which is the other armature connection.

The connection between "B" and "C" as indicated is a coil of iron wire which may be varied to control the charging current. We assume that you will drive this generator by means of a small engine or perhaps with an alternating current electric motor. With the generator ready to run you can close the switch and will get a discharge current on the ammeter. Then when you drive the generator and close the switch the meter should read in the opposite direction indicating charging current. Either the speed or the connection from "B" to "C" may be varied to control the current.

GASOLINE WORKS INTO CRANKCASE

Q—We have been working on a Franklin car and have sent the cylinders to the factory where they were reground and fitted with new pistons and rings. We now have the car assembled and running but have trouble due to gasoline working into the crankcase and diluting the oil. We find it necessary to drain the oil and replace about every week or two because it gets so thin. The engine hits on all six cylinders but the crankcase oil gets thin and the mixture becomes too rich

and the car occasionally goes dead. Would appreciate any information you can give.—G. F. Parker, Isabel, Ill.

Inasmuch as the cylinder castings are all separate, it is possible to get considerable variation when tightening down the bolts that hold them to the crankcase. The proper method of assembly is accordingly to get the cylinder blocks in place and the bolts also in place, but not thoroughly tightened down. The intake manifold should then be installed and the bolts tightened.

After this is done, the cylinder holding bolts can be tightened. If the cylinder bolts are tightened first, however, it may be found that when the intake manifold is installed it will be difficult to get the connections properly made and there may be air leaks which will cause trouble. We would accordingly suggest your taking the intake manifold off and carefully examining the gaskets and, if necessary, shellac them in place again, using a rather thick shellac.

You do not state exactly what model Franklin car you are working on, but it is quite probable that it is one equipped with an exhaust heater for the intake manifold. If this is the case, it is possible that the heater is not working properly, due to an accumulation of soot, and it will be necessary to take it apart and thoroughly clean it out. If you wish to test for air leaks at the intake manifold, you can do so by squirt-

ing gasoline on the gaskets, and if an air leak exists it will be noticed that there is a difference in the running of the engine due to the gasoline which is sucked in past the gaskets.

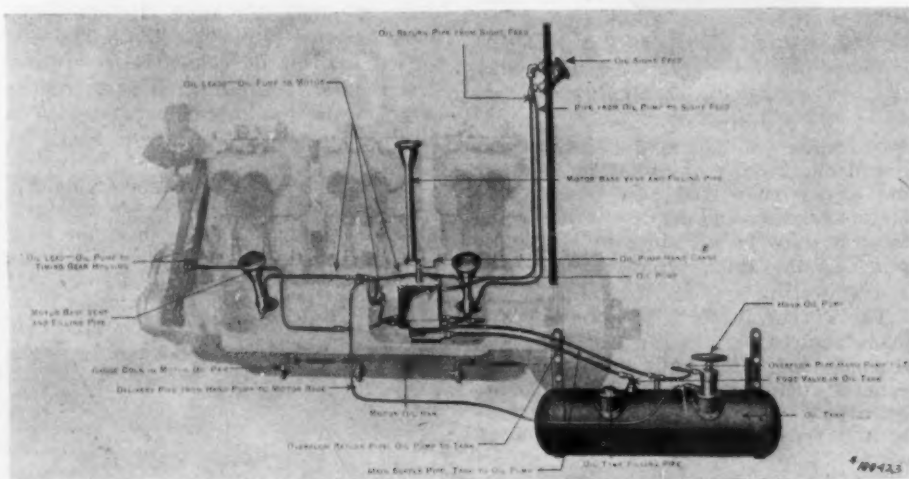
SELLING NEW CARS ON YOUR SHOP

The salesmen in your employ—do they know enough about the shop to be able to talk shop to new car customers? Every day, you will find that new car prospects are becoming more and more curious about your maintenance methods. They want to know what equipment you have and what the men in your shop know about their business.

When the salesman sets out to sell a new car, see that he has shop information at his finger tips. Make him tell the new car prospect of the various tools and pieces of equipment that are in your shop and the value of having them—how they save time and money and do better work. If necessary, take a man through the shop. **SELL HIM A NEW CAR ON THE SHOP.**

Close investigation AMONG THE CAR OWNERS THEMSELVES has proven that they are as much interested in your business as a whole as they are in the car they buy and they are NOT BUYING FROM THE SHOP WHICH CANNOT GIVE THEM GOOD, ECONOMICAL SERVICE, the kind of service that only the better equipped shop can give.

Oiling System of Lozier Six



Q—Give me through the Clearing House or by letter the oiling system of the engine in a type 22, series 115 Lozier Six.—Jas. T. Stevens, Woonsocket, S. D.

We have not definitely located the type Lozier to which you refer but show an oiling system applicable to Lozier cars. This will doubtless be similar or identical with the one on the car you have. The system of lubrication appears to be what is known as a constant level splash system. The bottom of the crankcase is filled with oil into which the ends of the connecting rods dip and the level of this oil is checked by means of

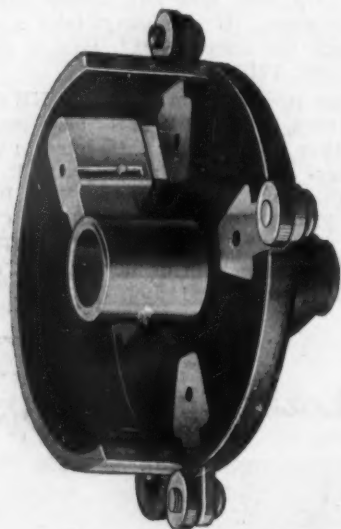
the three gage cocks at the side of the crankcase. The bottom of the crankcase holds about 3 quarts of oil.

In addition to this supply there is a four gallon tank located on the running board. A plunger type, engine driven, oil pump is supposed to pump oil from this reserve tank up through the oil sight feed and into the crankcase fast enough to take care of the oil as it is used up. This power driven pump appears to have a hand operated crank which can be used in emergency and a hand operated pump is also attached to the tank.

BOOSTING ACCESSORY SALES

Look for the man who bought a new car last year and had his eye on the dashing sport model. He would have bought it only he didn't have the necessary funds just then. Now, you can sell him the accessories and paint job that will make his car the "sport" model that he has wanted.

Why not arrange a certain group of accessories and sell them as "sport equipment" for the touring car? Say, one group would consist of a tire, a spotlight or even two spotlights, a paint job (re-painting the car to any color the owner may want) and then other accessories, trunk rack and trunk and put a flat price on the whole lot, offering a saving to the car owner.



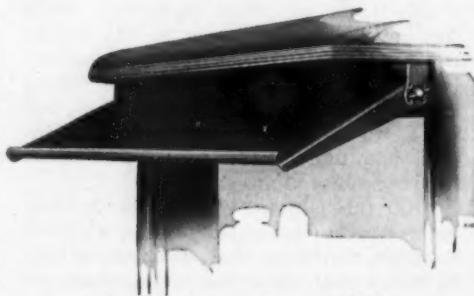
Turner timer for Fords

Of course, you can have as many sport equipment groups as you want, but let the owner know you have them. Sell him accessories and service in the group, too, this may be a chance to dispose of some of the things that haven't been selling well.

The Turner Junior Timer for Fords is manufactured by the Turner Mfg. Co., Kokomo, Ind. It is built along the same general lines of the Turner 2-in-1 model, introduced some time ago. The features of the timer are its easy installation



Knapp Limo-sedan fan



Turner visor and storm shield

and the fact that it requires no oiling while giving the service of a first class timer.

The Handy Hat Holder is announced by the Handy Appliance Co., Springfield, O. It is fastened to the top of the car as shown and will hold parcels, hats and other things which get in the way in a crowded car.

A new, decidedly attractive and efficient heat indicator has just been put on the market by the Superior Brass Mfg. Co. of Paterson, N. J. The new Subrasco heat indicator is thermostatically operated, and because of this principle the instrument is not affected in any way by temperature outside of the motor.

The Subrasco heat indicator differs from other temperature indicating instruments in that the temperature is indicated by a hand which is very easy to see from the driver's seat. On one side of the instrument the dial is very black, while the indicator hand is made luminous for easy night reading. The Subrasco instrument comes in two sizes. The regular, for all large cars, retails at \$10, while the Junior model, which is just being brought out, will retail at \$7.50.

The Turner Visor and Storm shield is another product of the Turner Mfg. Co., Kokomo, Ind. It is made in either steel or aluminum, 40 ins. long by 9 ins. wide. The retail price is \$3.75 and is applicable to all cars.



Handy hat holder

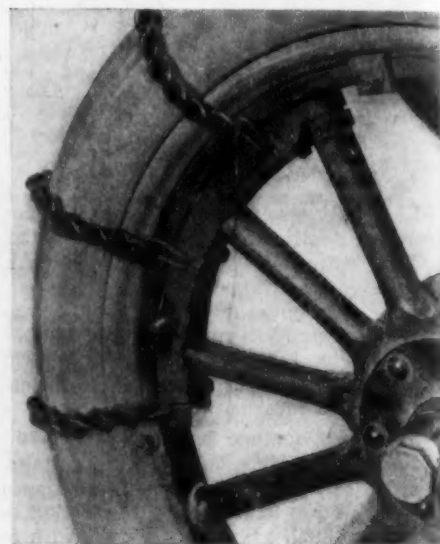
The Lee Day and Night Gasoline Gage for Fords is manufactured by the Columbus Co., 314 Broad street, Columbus, O. The feature of the gage is the fact that it can be seen as readily at night as in the day. This is made possible by three "humps" placed around the outside of the dial face. One indicates "full," the other "half-full" and the third "empty." It sells at \$2; Ford size, \$1.50. The gage fits on the tank in place of the regular cap.

Th Detroit Leather Works, 683 East La Fayette avenue, Detroit, Mich., announces the Flexo Cork Gaskets for Fords which are boxed and numbered

with the Ford part number on each compartment.

The Knapp Limo-Sedan Fan, shown in the cut on this page is the product of the Knapp Electric and Novelty Co., 511 West 51st street, New York. It is made in two sizes both selling at \$9, and is used in the enclosed car to expel smoke and keep it cool.

The Emergency Mud Boot Co., Crystal Springs, Miss., has recently placed on the market the Emergency Mud Boot which is made in three sizes, covering all sizes of tires. The cut shows the



Emergency mud boot

"Mud Boot" ready to pull the car out of the mud. As shown in the cut, the boot is made of three strands of chains which can be applied quickly to any wheel and which will aid greatly in getting cars through muddy roads.

This pressed steel mounting bracket for the spare tire or spare wheel carrier is made by the Oakes Co. of Indianapolis. Made entirely of high grade pressed steel parts, it is riveted together, with all seams spot-welded between rivets. The base is concave form and is bored for rivets which attach it to the gas tank apron of the car. The bracket face is designed to fit the dummy hubs used for holding spare disc or wire wheels.



Oakes spare tire bracket

Endless Chain That Keeps on Selling Used Cars

Daily Information to 100 Garage Men Brings Profit to Merchant and Helps the Small Town Shopman

By H. H. DUNN

ONE-THIRD of the used car problem has been solved to the satisfaction of Butler-Veitch Company, Marmon passenger car and Fageol truck dealers of San Francisco, by Jamie H. Smith, sales manager. Smith divides the used-car problem into three parts:

First, valuation and purchase;

Second, rehabilitation or reconstruction;

Third, re-sale.

The valuation part is a matter of the personal knowledge, skill and ability of the used-car buyer, and, in Smith's opinion, never will be solved in any other manner than by employing the best appraiser obtainable.

The rebuilding section is a matter of the honesty and ability of the repair department of the firm taking in the car.

The re-sale section is the one that has been most puzzling to automobile dealers, and the one that Smith has solved to such an extent that used cars are moving out of the Butler-Veitch headquarters in San Francisco virtually as rapidly as they are taken in.

About a year ago, Smith took a list of all the neighborhood garages and service stations in San Francisco. Then, through the salesmen, he made an arrangement with every owner of these garages and stations to pay that owner an attractive percentage on every used car he sold for Butler-Veitch. The plan began to work well in San Francisco, and was extended to every city, town and cross-roads garage in range of the Butler-Veitch distributing headquarters in northern California. There are now nearly 100 garages which are regular agencies for the used cars offered by this firm.

Special Department Organized

A regularly organized department is now devoted to the sales through these garages. A card-index of all the garages entering the arrangement is kept, and telephone or telegraph tolls are paid on messages connected with this business from garage and repair and service station men who are in the arrangement. No attempt is made to sell new cars through these agents. It is purely a used-car merchandising arrangement and is based on the theory that the automobile owner has more confidence in his neighborhood garage man than he has in any other man in the automotive industry.

"Out where the owner calls his neigh-

borhood garage man 'Bill,' and the garage man calls his neighbor, the owner, 'Tom,' is the place to sell used cars," says Smith. "We have proved this to the extent that our used cars are moving out, of the average, within 24 hours after we have rebuilt them; and that 75 to 80 per cent of our used-car sales are made through the garage and service station men. There are two prospects for a used car—the man who has no car at all and the man who has a small, low-priced car, and is ready for a larger car, but not prepared to pay the price for a large new car. The neighborhood garage man reaches both of these.

Local Garageman Advises

"When a man who has no car starts talking about getting a car, the neighborhood garage man knows of it; the chances are about nine to one that the prospect goes to the garage man whom he knows for advice as to what used car to buy and where to buy it. If the prospective owner is thinking of buying a small, low-priced, new car, very often the garage man can advise him honestly to buy a larger, more powerful, used car, at virtually the same outlay he would have made for the smaller new car. In fact, it is often far better for the man who is not a driver, and has had no experience with a car, to buy a used car first and learn his lessons and do his experimenting with that car before he puts a larger sum of money into a new automobile.

"Likewise, the man who has a small car but needs another and larger car, goes to his neighborhood garage man for advice as to what car to buy and where to buy it. We keep all these garage men advised, each morning, as to just what cars we have on hand, and what cars are due to come out of the repair and rebuilding shop within the next week.

"The garage man consequently knows just what he can suggest to the prospective buyer of a used car. When a garage man brings the prospect up to the point of seriously wanting to see the used car offered, he either sends him in to our headquarters in San Francisco, or we send the used car to the nearest Butler-Veitch branch, if it is in the country, or direct to the garage, if it is in San Francisco, Oakland, Berkeley, Alameda, San Mateo or any other of the towns around San Francisco Bay. If a sale is made, the garage man gets a

commission which is attractive to him, and which keeps him on the look-out for other prospects.

"Back of the garage man, of course, stands the fact that every used car we rebuild and sell is sold for exactly what it is. If there is 5000 miles or 25,000 miles left in the car, we say so, and we are very careful to put the limit of performance well below what we know the car will do. The result of this is that the purchaser is pleased with the deal he received through his neighborhood garage man and he becomes a valuable ally in three ways:

"First, he tells his neighbors that the garage man gave him good advice and a square deal, that brings in more prospects;

"Second, he talks up the advisability of buying a used big car rather than a new small car, and that gets us larger payments on the used cars;

"Third, when the satisfied customer wants a new car, he comes back to the garage man for advice—the same garage man who helped him get a used car—and we make a sale of a new car.

"Beyond this, we have a constantly increasing, widely distributed, and always active force of used car salesmen, who cost us nothing unless they produce a sale. This force consists of the garage men throughout northern California. Eventually, we shall have two or three hundred of them; now, we have more than one hundred, and it requires the complete attention of one employe all the time to take care of the correspondence, telephone calls and telegrams from these garage men."

MANY SALES AT QUINCY SHOW

QUINCY, Ill., March 24—Set in a bower of springtime colors, quite in contrast to the blustery weather which cut into the attendance for the scheduled four days, the fifth annual show of the Quincy Automobile Trades Association justified in a remarkable measure the optimism and confidence the dealers had placed in it. Not halted by the worst March weather in a quarter of a century, motor fans flocked to the Armory where 23 makes, including several models of the various factories, were shown. Enclosed cars and sport models predominated.

Numerous sales were reported and the predictions of a banner spring season seem to be borne out in the reports of purchases and the promising lists of prospectives resultant from this display.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

| | | |
|-------------------|--|----------------|
| Monmouth, Ill. | Monmouth Spring Festival | Mar. 23-31 |
| New York City | Washington Heights Automobile Show | Mar. 26-31 |
| Greenville, S. C. | Annual Automobile Show | Mar. 28-31 |
| Holdrege, Nebr. | Fourth Annual Show | Mar. 28-31 |
| Quincy, Ill. | Annual Show | Mar. 28-Apr. 1 |
| Bangor, Me. | Annual Show | Mar. 29-31 |
| Sullivan, Ind. | Automobile Show | Mar. 29-31 |
| Bridgeton, N. J. | Eighth Annual Automobile Show | Mar. 31-Apr. 7 |
| Auburn, N. Y. | Annual Automobile Show | April 4-7 |
| Eau Claire, Wisc. | Annual Automobile Show | Apr. 2-7 |
| Alpena, Mich. | Annual Show | May 7-12 |
| Red Bank, N. J. | Eighth Annual Show | May 13-20 |
| New York | Spring Automobile Salon, Hotel Commodore | Aug. 27-30 |
| Green Bay, Wis. | Annual Automobile Show | Sept. 2-5 |
| Sacramento | Annual Automobile Show | Sept. 2-5 |

| | | |
|-------------------|--------------------------------|-----------------|
| Memphis | Annual Automobile Show | Sept. 28-30 |
| Fresno, Calif. | Automobile Show | Sept. 28-Oct. 5 |
| Little Rock, Ark. | Annual Automobile Show | Oct. 8-13 |
| Waco, Texas | Waco Automobile Dealers' Assn. | Oct. 20-Nov. 5 |
| New York | Salon at the Hotel Astor | Nov. 4-10 |

CONVENTIONS

| | | |
|-----------------------|--|----------------|
| Spring Lake, N. J. | Summer Meeting of the Society of Automotive Engineers | June 19-23 |
| Dixville Notch, N. H. | Summer Meeting of the Automotive Equipment Association | June 25-July 1 |
| Olympia, Wash. | Convention Washington Automotive Trade Association | July |

RACES

| | | |
|---------------|---|--------|
| Indianapolis | Annual 500 Mile International Sweepstakes | May 30 |
| Tours, France | Grand Prix 500 Mile Race | July 2 |

SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

How the Story Goes

A friend of ours had had a job
Done at a service shop,
His car would jerk and bump and pull
Before it made a stop.

He worried quite a bit about
The way the bus had acted
And so unto the shop he went
To have the pain extracted.

But when he got his auto out,
He found it still the same,
"These guys are crooks," he told the world
And called them other names.

From friend to friend he went about
And told his tale of woe,
About the guy who'd done him wrong
And soaked him for his dough.

It wasn't long before he had
The story all around,—
He put the fellow out of work
And laid him on the ground.

So if you're called to do a job,
Be sure you do it well,
Some guys can talk and talk and talk
And talk and talk like—
no old maid ever dared to.

—Low Brication.

Some Luck

Now that airplanes can travel 248 miles
an hour, pedestrians ought to be glad
that one can not walk on air.

—Timely Films.

Someone Sent This in: Make Your Claims

Passenger: Does this car always make so much noise?
Driver: No, only when it's running.

"Bicycle Exhibit Comes Next Week."

—Headline, New York World.

Appropriately enough several weeks, and any number of
miles, behind the automobile.—Detroit Motor News.

All the pedestrians it is predicted, will become
motorists sooner or later. Perhaps. If they don't be-
come angels first.—Nashville Tennessean.

Next Week

We're going to print all the names of the guys who have
contributed to Squeeks & Rattles to date. Hurry up and get
your's in.

Wet Weather Wisdom

We tried to sell a set of chains
To a nice young fella named Borg;
He went insane; drove in the rain—
We called on him next in the morgue.

—The Air Host.

A HOWL FOR HELP

What has become of the old-timers who were so constant in
their efforts for Squeeks & Rattles? Did some of them die
because their stuff didn't get printed? C'mon, gang, get together,
give the mailmen a job hustling your dope up here. (We got a
grudge against the guy that brings ours, anyway.)

MOTOR CARS CONQUER SAHARA DESERT

—Headline.

That's interesting, of course. But isn't this new form of
desert transportation going to result in flooding the market
with second-hand camels?—Detroit Motor News.

Fable

(By Roy L. Miller)

There once was a car owner who did not proclaim himself
a mechanic after installing a connecting rod in his lizzie.

The Expert Driver

There was an expert driver,
Who always drove with care,
He never had an accident,
He drove most anywhere.
He'd cut across the car tracks,
Dodge pedestrians, or truck,
And getting by the traffic cop,
He always was in luck.
Turning corners on two wheels
He'd seem to be delighted.
When he'd hit the center of the block
And all four wheels were righted,
He'd step upon the throttle
And give her lots of gas.
He didn't care about the cost,
For he had lots of brass.
He cut in front of a car one day,
There was a crash, a roar,
He was an expert driver
But—he isn't any more.

—Exchange.

"There are two sides to the pedestrian question," says a Judge.
Yes, and Dart W. Speedwell, who likes to drive through safety
zones, says he doesn't care which side he hits them on.—Detroit
Motor News.

Specifications of Current Motor Truck Models

| NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | Final Drive |
|----------------------|---------------|---------------|-----------------|-------------------|-------------|-------------------------|---------------|---------------|-----------------|-------------------|-------------|------------------------|---------------|---------------|-----------------|-------------------|-------------|
| | | | | Front Rear | | | | | | Front Rear | | | | | | Front Rear | |
| Ace.....30 | 1 1/2 | \$2400 | 3 1/2x5 | 34x3 1/2 34x6 | W | Corbitt.....E-22 | 1 | \$1480 | 3 1/2x5 | 34x3 1/2 34x4 | W | Gary.....J | 2 1/2 | \$2850 | 4 1/2x5 1/2 | 36x4 36x8 | W |
| Ace.....40 | 2 | 2850 | 4 1/2x5 1/2 | 36x4 36x7 | W | Corbitt.....D-22 | 1 1/2 | 2200 | 3 1/2x5 | 34x3 1/2 34x5 | W | Gary.....K | 3 1/2 | 3790 | 4 1/2x6 | 36x5 40x5d | W |
| Ace.....60 | 2 1/2 | 3400 | 4 1/2x5 1/2 | 36x4 36x8 | W | Corbitt.....C-22 | 2 | 2600 | 4 1/2x5 1/2 | 36x3 1/2 36x7 | W | Gary.....M | 5 | 4450 | 5 x6 1/2 | 36x6 40x6d | W |
| Acme.....20 | 1 | ..... | 3 1/2x5 | 35x5 35x5 1/2 | W | Corbitt.....B-22 | 2 1/2 | 3000 | 4 1/2x5 1/2 | 36x4 36x7 | W | **Gotfredson.....20 | 1 | 2075 | 3 1/2x5 1/2 | 34x5 34x5 | W |
| Acme.....30 | 1 1/2 | ..... | 3 1/2x5 | 34x3 1/2 34x5 | W | Corbitt.....R-22 | 3 | 3200 | 4 1/2x5 1/2 | 36x4 36x8 | W | **Gotfredson.....31 | 1 1/2 | 3000 | 4 x5 1/2 | 36x6 38x7 1/2 | W |
| Acme.....40 | 2 | ..... | 3 1/2x5 | 34x3 1/2 34x5 | W | Corbitt.....A-22 | 3 1/2 | 3800 | 4 1/2x5 1/2 | 36x5 36x10 | W | **Gotfredson.....A | 2 1/2 | 3375 | 4 x5 1/2 | 36x4 36x7 | W |
| Acme.....60 | 3 | ..... | 4 1/2x5 1/2 | 36x4 36x7 | W | Corbitt.....AA-22 | 5 | 4500 | 4 1/2x6 | 36x6 40x6d | W | **Gotfredson.....B | 3 1/2 | 4475 | 4 1/2x5 1/2 | 36x5 36x10 1/2 | W |
| Acme.....60L | 3 | ..... | 4 1/2x5 1/2 | 36x4 36x7 1/2 | W | | | | | | | **Gotfredson.....100 | 5-6 | 5500 | 5 x6 1/2 | 36x6 40x14 | W |
| Acme.....90 | 4 1/2 | ..... | 4 1/2x5 1/2 | 36x5 40x10 | W | | | | | | | Graham Bros..... | 1 | 1265 | 3 1/2x5 1/2 | 33x4 1/2 34x5 1/2 | B |
| Acme.....125 | 6 1/2 | ..... | 4 1/2x6 | 36x6 40x12 | W | | | | | | | Graham Bros..... | 1 1/2 | 1325 | 3 1/2x5 1/2 | 33x4 1/2 36x6 1/2 | B |
| American.....25 | 2 1/2 | 3350 | 4 x6 | 36x4 36x4 1/2 | W | Day-Elder.....AS | 1 | 1600 | 3 1/2x5 | 35x5 35x5 1/2 | W | Graham Bros..... | 1 1/2 | 1245 | 3 1/2x5 | 33x5 33x5 1/2 | B |
| American.....40 | 4 | 4275 | 4 1/2x6 | 36x5 36x5 1/2 | W | Day-Elder.....B | 1 1/2 | 2000 | 3 1/2x5 | 34x3 1/2 34x5 | W | Graham Bros..... | 1 1/2 | 1245 | 3 1/2x5 | 33x5 33x5 1/2 | B |
| American.....50 | 5 | 4500 | 4 1/2x6 | 36x5 36x12 | W | Day-Elder.....D | 2 | 2400 | 4 1/2x5 1/2 | 36x4 36x7 | W | Graham Bros..... | 1 1/2 | 1750a | 3 1/2x5 | 36x3 1/2 36x5 1/2 | W |
| Armstrong.....20 | 1 | ..... | 3 1/2x5 1/2 | 34x3 1/2 34x6 | W | Day-Elder.....C | 2 1/2 | 2750 | 4 1/2x5 1/2 | 36x4 36x7 | W | Graham Bros..... | 1 1/2 | 2250a | 3 1/2x5 | 36x3 1/2 36x5 | W |
| Armstrong.....21 | 1 1/2 | ..... | 3 1/2x5 1/2 | 34x3 1/2 34x6 | W | Day-Elder.....F | 3 1/2 | 3150 | 4 1/2x5 1/2 | 36x5 36x5 1/2 | W | Graham Bros..... | 20 | 2475a | 4 1/2x5 1/2 | 36x4 36x7 1/2 | W |
| Armstrong.....40-B | 1 1/2 | ..... | 4 1/2x5 1/2 | 34x3 1/2 34x6 | W | Day-Elder.....E | 5 | 4250 | 4 1/2x6 | 36x5 40x6 1/2 | W | Graham Bros..... | 30 | 3300a | 4 1/2x5 1/2 | 36x5 36x5 1/2 | W |
| Armstrong.....40-C | 1 1/2 | ..... | 4 1/2x5 1/2 | 34x3 1/2 34x6 | W | Dearborn.....E | 1 | 1600 | 3 1/2x5 | 35x5 35x5 1/2 | W | Graham Bros..... | 75P | 4225a | 4 1/2x5 1/2 | 36x6 42x9 1/2 | W |
| Armstrong.....HW-B | 2 1/2 | ..... | 4 1/2x5 1/2 | 36x4 36x7 1/2 | W | Dearborn.....FX | 1 1/2 | 2300 | 3 1/2x5 1/2 | 34x4 34x5 | W | Graham Bros..... | 40 | 3850a | 4 1/2x5 1/2 | 36x5 36x5 1/2 | W |
| Armstrong.....HW-C | 2 1/2 | ..... | 4 1/2x5 1/2 | 36x4 36x7 1/2 | W | Dearborn.....F | 1 1/2 | 2180 | 3 1/2x5 1/2 | 34x4 34x5 | W | Graham Bros..... | 50 | 4450a | 4 1/2x6 | 36x6 40x6 1/2 | W |
| Armstrong.....KW-B | 3 1/2 | ..... | 4 1/2x6 | 36x5 36x5 1/2 | W | Dearborn.....48 | 2 | 2590 | 3 1/2x5 1/2 | 34x4 1/2 34x7 | W | | | | | | |
| Armstrong.....KW-C | 3 1/2 | ..... | 4 1/2x6 | 36x5 36x5 1/2 | W | Defiance.....G | 1 | 1525 | 3 1/2x5 | 35x5 35x5 1/2 | B | Hall.....1 1/2 | 1 1/2 | 3100 | 3 1/2x5 | 34x5 38x7 1/2 | W |
| *Atlas.....22 | 1 | 1495 | 3 1/2x5 1/2 | 34x4 1/2 34x4 1/2 | W | Defiance.....D | 1 1/2 | 1845 | 3 1/2x5 | 35x5 36x6 | I | Hall.....2 1/2 | 2 1/2 | 3275 | 4 1/2x5 1/2 | 36x5 36x6 1/2 | W |
| *Atlas.....44 | 1 1/2 | 1950 | 3 1/2x5 1/2 | 36x6 36x6 1/2 | W | Defiance.....E | 2 | 2075 | 3 1/2x5 | 35x5 38x7 1/2 | I | Hall.....3 1/2 | 3 1/2 | 4100 | 4 1/2x5 1/2 | 36x5 36x6 1/2 | W |
| Atterbury.....20R | 1 1/2 | 2475 | 3 1/2x5 | 34x3 1/2 34x5 | W | Denby.....31 | 1 1/2 | 1485 | 3 1/2x5 | 35x5 35x5 1/2 | B | Hall.....5 | 5 | 5100 | 4 1/2x5 1/2 | 36x5 40x6d | C |
| Atterbury.....22C | 2 1/2 | 3375 | 3 1/2x5 1/2 | 36x4 36x4 1/2 | W | Denby.....33 | 1 1/2 | 2145 | 3 1/2x5 | 35x5 38x7 1/2 | I | Hall.....7 | 7 | 5100 | 4 1/2x5 1/2 | 36x5 40x6d | C |
| Atterbury.....22D | 2 1/2 | 3475 | 3 1/2x5 1/2 | 36x4 36x4 1/2 | W | Denby.....35 | 2 1/2 | 2795 | 4 1/2x5 1/2 | 36x4 36x7 | I | Harvey.....W OA | 2 | 2650 | 4 1/2x5 1/2 | 36x4 34x7 | W |
| Atterbury.....22D | 3 1/2 | 4275 | 4 1/2x5 1/2 | 36x5 40x5d | W | Denby.....27 | 4 | 3895 | 4 1/2x5 1/2 | 36x5 36x5 1/2 | I | Harvey.....WFA | 2 1/2 | 2950 | 4 1/2x5 1/2 | 36x4 36x7 | W |
| Atterbury.....22D | 3 1/2 | 4375 | 4 1/2x5 1/2 | 36x5 40x5d | W | Dependable.....A | 3 1/2 | 4295 | 4 1/2x5 1/2 | 36x6 40x6d | I | Harvey.....WHA | 3 1/2 | 3950 | 4 1/2x6 | 36x5 36x5d | W |
| Atterbury.....8E | 5 | 4975 | 4 1/2x6 | 36x5 40x6d | W | Dependable.....C | 2 | 2390 | 4 1/2x5 1/2 | 34x5 34x5 | W | Hawkeye.....O | 1 | 1375 | 3 1/2x5 1/2 | 34x5 34x5 1/2 | I |
| Atterbury.....8E | 5 | 5125 | 4 1/2x6 | 36x5 40x6d | W | Dependable.....D | 2 1/2 | 2650 | 4 x5 1/2 | 34x5 36x6 | W | Hawkeye.....K | 1 1/2 | 1645 | 3 1/2x5 1/2 | 34x5 34x5 1/2 | I |
| Autocar.....21UF | 1 1/2 | 2200 | 4 1/2x4 1/2 | 34x4 34x4 | D | Dependable.....E | 3 | 2950 | 4 1/2x5 1/2 | 36x4 36x7 | W | Hawkeye.....M | 2 | 2145 | 4 1/2x5 | 36x4 36x6 | I |
| Autocar.....21UG | 1 1/2 | 2300 | 4 1/2x4 1/2 | 34x4 34x4 | D | Diamond T.....O-3 | 1-1 1/2 | 1975 | 3 1/2x5 1/2 | 36x3 1/2 36x4 1/2 | W | Hawkeye.....N | 3 1/2 | 3700 | 4 1/2x5 1/2 | 36x5 36x10 1/2 | I |
| Autocar.....27H | 2-3 | 3100 | 4 x5 1/2 | 34x5 36x7 | D | Diamond T.....T | 1 1/2 | 2250 | 3 1/2x5 1/2 | 36x3 1/2 36x5 | W | Hendrickson.....O | 1 1/2 | 2200 | 3 1/2x5 1/2 | 36x4 36x5 1/2 | W |
| Autocar.....27K | 2-3 | 3200 | 4 x5 1/2 | 34x5 36x7 1/2 | D | Diamond T.....U2 | 2 1/2 | 2650 | 4 x5 1/2 | 36x4 36x8 1/2 | W | Hendrickson.....N | 2 1/2 | 2690 | 4 1/2x5 1/2 | 36x4 36x7 1/2 | W |
| Autocar.....26Y | 4-6 | 4200 | 4 1/2x5 1/2 | 34x6 36x12 | D | Diamond T.....K | 3 1/2 | 3750 | 4 1/2x5 1/2 | 36x5 36x5d | W | Hendrickson.....M | 3 1/2 | 3000 | 4 1/2x5 | 36x5 36x5d | W |
| Autocar.....26-B | 4-6 | 4350 | 4 1/2x5 1/2 | 34x6 36x12 | D | Diamond T.....EL | 5 | 4325 | 4 1/2x5 1/2 | 36x6 40x6d | W | Hendrickson.....K | 5 | 4000 | 5 x6 1/2 | 36x6 40x6 | W |
| Available.....H1 | 1 1/2 | 2475 | 4 x5 | 36x3 1/2 36x5 1/2 | W | Diamond T.....S | 5 | 4500 | 4 1/2x6 | 36x6 40x6d | W | Huffman.....B | 1 1/2 | 1795 | 3 1/2x5 | 34x5 34x5 1/2 | I |
| Available.....H2 | 2 1/2 | 2775 | 4 x5 | 36x3 1/2 36x5 1/2 | W | Doane.....2 1/2 | 2 1/2 | 4100b | 4 1/2x5 1/2 | 36x5 36x7 | C | Huffman.....D | 1 1/2 | 1685 | 3 1/2x5 1/2 | 36x4 36x6 | I |
| Available.....H3 | 3 1/2 | 3100 | 4 x5 | 36x4 36x8 1/2 | W | Doane.....3 1/2 | 3 1/2 | 5100b | 4 1/2x5 1/2 | 36x5 36x5d | C | Huffman.....A-A | 1-1 1/2 | 2805 | 4 1/2x5 1/2 | 36x4 36x7 | W |
| Available.....H3 1/2 | 3 1/2 | 4175 | 5 x6 | 36x5 40x5d | W | Doane.....6 | 6 | 6000b | 5 x6 1/2 | 36x6 40x6d | C | Hurlburt.....B-B | 2-2 1/2 | 2900 | 4 1/2x5 1/2 | 36x4 36x4 1/2 | W |
| Available.....H5 | 5 | 5375 | 5 x6 | 36x6 40x12 | W | *Dodge Brothers.....K-2 | 3 1/2 | 2490 | 3 1/2x5 1/2 | 36x4 36x7 | W | Hurlburt.....C-C | 3-3 1/2 | 3475 | 4 1/2x5 1/2 | 36x5 36x5 1/2 | W |
| *Avery.....1 | 1 | ..... | 3 x4 1/2 | 34x5 34x5 1/2 | I | Dorris.....K-4 | 2-2 1/2 | 3400 | 4 1/2x5 1/2 | 36x4 36x7 | W | Hurlburt.....D-D | 4-4 1/2 | 4150 | 4 1/2x6 | 36x5 36x6 1/2 | W |
| | | | | | | Dorris.....K-7 | 3 1/2 | 3400 | 4 1/2x5 1/2 | 36x5 36x10 | W | Hurlburt.....E-E | 6-6 1/2 | 4950 | 4 1/2x6 1/2 | 36x6 40x6d | W |
| | | | | | | *Dodge Brothers.....103 | 3 1/2 | 685a | 3 1/2x5 | 31x14 34x14 | B | | | | | | |
| Beck.....A Jr. | 1 1/2 | 1285a | 3 1/2x5 | 34x4 1/2 34x4 1/2 | I | Double Drive.....B | 3 | 4000 | 4 1/2x5 1/2 | 36x6 36x6 | W | Indep'd't (Iowa).....B | 1 | 1665 | 3 1/2x5 | 34x3 1/2 34x4 | I |
| Beck.....B-30 | 1 1/2 | 1350 | 3 1/2x5 | 34x5 36x6 | W | Duplex.....A | 2 | 2775 | 4 x5 1/2 | 35x5 38x7 1/2 | W | Indep'd't (Iowa).....G | 1 1/2 | 2040 | 3 1/2x5 1/2 | 34x3 1/2 34x5 | I |
| Beck.....C-40 | 2 | 1550 | 3 1/2x5 | 36x6 36x6 | W | Duplex.....E | 3 1/2 | 3500 | 4 1/2x5 1/2 | 36x8 36x8 | I | Indep'd't (Ia.).....HI | 2 1/2 | 2940 | 4 1/2x5 1/2 | 36x4 36x7 | I |
| Beck.....D-50 | 2 1/2 | 1950 | 4 1/2x5 1/2 | 38x7 40x8 | W | Duty.....22 | 2 | 1590 | 3 1/2x5 | 34x3 1/2 34x5 | I | *Indiana.....10 | 1 | ..... | 3 1/2x5 1/2 | 34x5 34x5 1/2 | B |
| Bell.....M (Iowa) | 1 1/2 | 1445 | 3 1/2x5 1/2 | 35x5 35x5 1/2 | W | | | | | | | Indiana.....12 | 1 1/2 | ..... | 3 1/2x5 1/2 | 34x3 1/2 34x5 1/2 | W |
| Bell.....E (Iowa) | 1 1/2 | 2100 | 3 1/2x5 1/2 | 34x3 1/2 34x5 | I | | | | | | | Indiana.....20 | 2 | ..... | 4 1/2x5 1/2 | 36x4 36x7 1/2 | W |
| Bell.....O (Iowa) | 2 1/2 | 2550 | 4 1/2x5 1/2 | 34x4 34x6 | I | | | | | | | Indiana.....25 | 2 1/2 | ..... | 4 1/2x5 1/2 | 36x4 36x8 1/2 | W |
| Bessemer.....G | 1 | 1450 | 3 1/2x5 | 35x5 35x5 1/2 | I | | | | | | | Indiana.....35 | 3 1/2 | ..... | 4 1/2x5 1/2 | 36x5 36x5d | W |
| Bessemer.....H-2 | 1 1/2 | 1990 | 3 1/2x5 | 36x3 1/2 36x5 | D | | | | | | | Indiana.....51 | 5-7 | ..... | 5 x6 1/2 | 36x5 40x6d | W |
| Bessemer.....H-2 | 2 1/2 | 2895 | 4 1/2x5 1/2 | 36x4 36x4 1/2 | I | Eagle.....101 | 1 1/2 | 1875 | 3 1/2x5 1/2 | 34x5 34x5 | I | *International.....S | 1 | 1250 | 3 1/2x5 | 32x4 1/2 32x4 1/2 | I |
| Bessemer.....K-2 | 4 | 3695 | 4 1/2x5 1/2 | 36x5 36x10 | I | Eagle.....100-2 | 2 | 2275 | 3 1/2x5 1/2 | 34x4 34x7 1/2 | I | International.....21 | 1 | 1550 | 3 1/2x5 1/2 | 36x3 1/2 36x3 1/2 | I |
| Bethlehem.....KN | 2 | 1385 | 3 1/2x5 | 35x5 35x5 1/2 | B | | | | | | | International.....31 | 1 1/2 | 1650 | 3 1/2x5 1/2 | 36x3 1/2 36x5 1/2 | I |
| Bethlehem.....GN | 2 | 2185 | 4 x5 | 34x4 34x6 1/2 | D | F. W. D.....B | 3 | 4200 | 4 1/2x5 1/2 | 36x6 36x6 | B | International.....41 | 2 | 2100 | 3 1/2x5 1/2 | 36x3 1/2 36x6 1/2 | I |
| Bethlehem.....HN | 3 | 2985 | 4 1/2x6 | 36x5 36x10 | W | Fageol.....1 1/2 | 1 1/2 | 3000 | 3 1/2x5 1/2 | 34x3 1/2 34x6 1/2 | W | International.....52 | 2 1/2 | 3500 | 4 1/2x5 | 36x6 36x6 1/2 | I |
| Brinton.....C | 2 | 2500 | 3 1/2x5 | 34x4 34x5 | W | Fageol.....2 1/2 | 2 1/2 | 3900 | 4 1/2x5 1/2 | 36x4 36x7 | W | International.....61 | 3 | 2400 | 4 1/2x5 | 36x4 36x7 1/2 | I |
| Brinton.....D | 3 | 2975 | 4 1/2x5 1/2 | 36x4 36x7 | W | Fageol.....3 1/2 | 3 1/2 | 5000 | 4 1/2x5 1/2 | 36x5 40x5d | W | International.....62 | 3 | 2600 | 4 1/2x5 | 36x4 36x7 | I |
| Brockway.....E | 1 | ..... | 4 x5 | 33x5 33x5 1/2 | B | Fageol.....5 | 5 | 5700 | 4 1/2x5 1/2 | 36x6 40x6d | W | International.....101 | 5 | 3600 | 4 1/2x5 | 36x5 40x12 1/2 | I |
| Brockway.....S-5 | 1 1/2 | ..... | 4 x5 | 36x4 36x6 | W | Fargo.....R | 2 | 1700 | 3 1/2x5 | 36x4 36x8 | I | International.....102 | 5 | 3800 | 4 1/2x5 | 36x5 36x12 | I |
| Brockway.....SK | 1 1/2 | ..... | 4 1/2x5 1/2 | 36x4 36x6 | W | *Federal.....1 1/2 | 1 1/2 | ..... | 3 1/2x5 | —25m —5m | W | | | | | | |
| Brockway.....KR | 2 1/2 | ..... | 4 1/2x5 1/2 | 36x4 36x8 | W | Federal.....SD | 1 1/2 | ..... | 3 1/2x5 | 35x5 36x6 1/2 | W | K. W.....M | 1 1/2 | 3100 | | | |

Specifications of Current Motor Truck Models—Continued

| NAME AND MODEL | | | | | | | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | | Final Drive | NAME AND MODEL | | | | | | | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | | Final Drive |
|-------------------|-------------|-------|---------------|----------|----------|---|--------------------------|---------------|-----------------|---------------|----------|-------------|----------------|----------------------|---------|---------------|---------------|----------|----------|---------------|---------------|-----------------|-----------------|-------|-------------|--|-------------|
| NAME AND MODEL | | | | | | | Tons Capacity | Chassis Price | Bore and Stroke | Front | Rear | Final Drive | NAME AND MODEL | | | | | | | Tons Capacity | Chassis Price | Bore and Stroke | Front | Rear | Final Drive | | |
| Kleiber.....BB | 2 | 3600 | 4 1/2 x 5 1/2 | 36x4k | 36x7k | W | Ogden.....A2 | 1 | ..... | 3 1/2 x 5 | 34x5n | 34x5n | W | Selden.....70 | 3 1/2-5 | 3750 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W | | | | | | | |
| Kleiber.....B | 2 1/2 | 3950 | 4 1/2 x 5 1/2 | 36x5k | 36x8 | W | Ogden.....D | 1 1/2 | ..... | 3 1/2 x 5 | 36x3 1/2 | 36x5 | W | Selden.....90 | 5-7 | 4050 | 4 1/2 x 6 | 36x6 | 40x12 | W | | | | | | | |
| Kleiber.....C | 3 1/2 | 4600 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Ogden.....E | 2 1/2 | ..... | 3 1/2 x 5 | 36x3 1/2 | 36x4k | W | *Service.....12 | 3 1/2 | ..... | 3 1/2 x 4 1/2 | 32x4 1/2 | 32x4 1/2 | B | | | | | | | |
| Kleiber.....D | 5 | 5300 | 5 x 6 1/2 | 36x6 | 40x12 | W | Old Reliable.....A | 1 1/2 | \$2350 | 4 x 5 | 34x4 | 36x6 | W | *Service.....25 | 1 1/2 | ..... | 3 1/2 x 5 1/2 | 34x5n | 34x5n | B | | | | | | | |
| Koehler.....D | 1 1/2 | 2150 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Old Reliable.....B | 2 1/2 | 3500 | 4 1/2 x 6 | 34x4 | 36x4d | W | Service.....21 | 1 1/2 | ..... | 4 x 5 1/2 | 34x3 1/2 | 34x5 | W | | | | | | | |
| Koehler.....M | 2 1/2 | 3175 | 4 x 5 1/2 | 36x4 | 36x7 | W | Old Reliable.....C | 3 1/2 | 4250 | 4 1/2 x 6 | 36x5 | 36x5d | W | Service.....32 | 2 | ..... | 4 x 5 1/2 | 36x3 1/2 | 36x7 | W | | | | | | | |
| Koehler.....MCS | 2 1/2 | 3275 | 4 x 5 1/2 | 36x4 | 36x7 | W | Old Reliable.....D | 5 | 5000 | 4 1/2 x 6 | 36x6 | 40x6d | W | Service.....37 | 2 | ..... | 4 1/2 x 5 1/2 | 35x5n | 38x7n | W | | | | | | | |
| Koehler.....F | 3 1/2 | 4470 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W | Old ReliableKLM | 7 | 6000 | 4 1/2 x 6 1/2 | 36x6 | 40x7d | W | Service.....52 | 3 | ..... | 4 1/2 x 5 1/2 | 36x5 | 36x8 | W | | | | | | | |
| Koehler, MT. Trac | 5 | 3275 | 4 x 5 1/2 | 36x4 | 36x7 | W | *Oldsmobile Econ | 1 | 1095 | 3 1/2 x 5 1/2 | 35x5n | 35x5n | I | Service.....72 | 3 1/2 | ..... | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | | | | | | | |
| Krebs.....23 | 3 1/2 | ..... | 3 1/2 x 5 | 34x4 1/2 | 34x4 1/2 | B | Olympic.....A | 2 1/2 | 3200 | 4 1/2 x 5 1/2 | 36x4 | 36x8 | W | Service.....77 | 4 | ..... | 4 1/2 x 6 | 36x5 | 36x5d | W | | | | | | | |
| Krebs.....24 | 1 | ..... | 3 1/2 x 5 | 34x5 | 34x5 | W | Onsida.....B9 | 1 1/2 | 2825 | 4 x 5 1/2 | 36x3 1/2 | 36x7 | W | Service.....102 | 6 | ..... | 4 1/2 x 6 | 36x6 | 40x6d | W | | | | | | | |
| Krebs.....45 | 1 1/2 | ..... | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Onsida.....C9 | 2 1/2 | 3200 | 4 x 5 1/2 | 36x4 | 36x8 | W | Signal.....NF | 1 | ..... | 3 1/2 x 5 | 34x5n | 36x6n | W | | | | | | | |
| Krebs.....75 | 2 1/2 | ..... | 4 1/2 x 5 1/2 | 36x4 | 36x8 | W | Onsida.....D9 | 3 1/2 | 4050 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W | Signal.....H | 1 1/2 | ..... | 4 1/2 x 5 1/2 | 34x4 | 36x6 | W | | | | | | | |
| Krebs.....110 | 3 1/2 | ..... | 4 1/2 x 5 1/2 | 36x5 | 40x10 | W | Onsida.....E9 | 5 | 4725 | 4 1/2 x 5 1/2 | 36x6 | 40x12 | W | Signal.....J | 2 1/2 | ..... | 4 1/2 x 5 1/2 | 34x4 | 36x8 | W | | | | | | | |
| Krebs.....140 | 5 | ..... | 4 1/2 x 6 | 36x6 | 40x6d | W | Oshkosh.....A | 2 | 2485 | 3 1/2 x 5 | 36x6n | 36x6n | B | Signal.....M | 3 1/2 | ..... | 4 1/2 x 5 1/2 | 36x5 | 40x5d | W | | | | | | | |
| | | | | | | | Oshkosh.....AA | 2 | 2585 | 3 1/2 x 5 | 36x6n | 36x6n | B | Signal.....R | 5 | ..... | 4 1/2 x 6 | 36x6 | 40x6d | W | | | | | | | |
| | | | | | | | Oshkosh.....B | 2 1/2 | 3485 | 4 x 5 1/2 | 38x7n | 38x7n | B | *Standard.....75 | 1 1/2 | 1330 | 3 1/2 x 5 | 33x5n | 33x5n | W | | | | | | | |
| | | | | | | | Oshkosh.....BB | 2 1/2 | 3585 | 4 x 5 1/2 | 38x7n | 38x7n | B | Standard.....1-K | 1 1/2 | 1605 | 3 1/2 x 5 | 34x3 1/2 | 34x5k | W | | | | | | | |
| | | | | | | | *Overland.....4 | 1 1/2 | 425 | 3 1/2 x 4 | 30x3 1/2 | 30x3 1/2 | B | Standard.....76 | 2 1/2-3 | 2796 | 4 1/2 x 5 1/2 | 36x4k | 36x8 | W | | | | | | | |
| Larrabee.....X-2 | 1 | 1925 | 3 1/2 x 4 1/2 | 34x5n | 34x5n | B | Packard.....EC | 2-3 | 3100 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Sterling.....1 1/2 | 1 1/2 | 2885 | 4 x 5 1/2 | 36x3 1/2 | 36x5k | W | | | | | | | |
| Larrabee.....U | 1 1/2 | 2400 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Packard.....EX | 2-2 1/2 | 3100 | 4 1/2 x 5 1/2 | 36x6n | 40x8n | W | Sterling.....2 | 2 | 3085 | 4 x 5 1/2 | 36x1k | 36x6k | W | | | | | | | |
| Larrabee.....J | 1 1/2-2 1/2 | 2400 | 3 1/2 x 5 | 34x3 1/2 | 34x5k | W | Packard.....ED | 3 1/2-4 1/2 | 4100 | 5 x 5 1/2 | 36x5 | 36x5d | W | Sterling.....2 1/2 | 2 1/2 | 3290 | 4 1/2 x 5 1/2 | 36x1k | 36x6k | W | | | | | | | |
| Larrabee.....K | 2 1/2-3 | 2100 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Packard.....EF | 5 1/2-6 1/2 | 4500 | 5 x 5 1/2 | 36x6 | 40x6d | W | Sterling.....3 1/2 | 3 1/2 | 4325 | 4 1/2 x 5 1/2 | 36x5k | 40x5dk | W | | | | | | | |
| Larrabee.....K-5 | 2 1/2-3 1/2 | 3450 | 4 1/2 x 5 1/2 | 36x4 | 36x8 | W | Paige.....52-19 | 1 1/2 | 1950 | 4 x 5 1/2 | 34x3 1/2 | 34x5 | W | Sterling.....5-W | 5 | 4950 | 5 x 6 1/2 | 36x6 | 40x6d | W | | | | | | | |
| Larrabee.....L-4 | 3 1/2-5 | 4000 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Paige.....54-20 | 2 1/2 | 2420 | 4 1/2 x 5 1/2 | 34x4 | 34x8 | W | Sterling.....5-C | 5 | 5500 | 5 x 6 1/2 | 36x6 | 40x6d | C | | | | | | | |
| Larrabee.....W | 5-7 | 4800 | 4 1/2 x 6 | 36x6 | 40x6d | W | Paige.....51-18 | 3 1/2 | 3145 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Sterling.....7 1/2 | 7 1/2 | 6000 | 5 x 6 1/2 | 36x6 | 40x7d | C | | | | | | | |
| | | | | | | | Parker.....C-22 | 1 | 1875 | 3 1/2 x 5 1/2 | 34x5n | 34x5n | W | *Stewart.....Utility | 4-11 | 1245 | 3 1/2 x 5 1/2 | 34x4 1/2 | 34x4 1/2 | I | | | | | | | |
| | | | | | | | Parker.....G-22 | 2 1/2 | 3200 | 4 1/2 x 6 | 34x4 | 36x4d | W | Stewart.....15 | 15-1 | 1445 | 3 1/2 x 5 1/2 | 35x5n | 35x5n | I | | | | | | | |
| | | | | | | | Parker.....J-20 | 3 1/2 | 3050 | 4 1/2 x 6 | 36x5 | 40x5d | W | Stewart.....9 | 9-12 | 1790 | 3 1/2 x 5 1/2 | 34x3 1/2 | 34x6 | I | | | | | | | |
| | | | | | | | Parker.....M-20 | 5 | 4850 | 5 x 6 | 36x6 | 40x6d | W | Stewart.....7-X | 7-X | 2390 | 4 1/2 x 5 1/2 | 34x4 | 34x8 | I | | | | | | | |
| | | | | | | | Patriot.....Revere | 1 | 1380 | 3 1/2 x 5 | 35x5n | 35x5n | W | Stewart.....10-X | 10-X | 3190 | 4 1/2 x 6 | 36x5 | 36x10 | I | | | | | | | |
| | | | | | | | Patriot.....Lincoln | 2 | 2050 | 4 x 5 1/2 | 34x4 | 34x6 | W | *Stewart.....1 1/2 | 1 1/2 | 1245 | 4-3 1/2 | 34x4 1/2 | 34x4 1/2 | B | | | | | | | |
| | | | | | | | Patriot.....LS-800 | 2 | 2175 | 4 x 5 1/2 | 36x5 | 36x7 | W | *Stoughton.....C | 3 1/2 | 1095 | 3 1/2 x 5 1/2 | 34x4 1/2 | 34x4 1/2 | B | | | | | | | |
| | | | | | | | Patriot Wash'n | 3 | 2900 | 4 1/2 x 5 1/2 | 36x5 | 36x7 | W | Stoughton.....A | 1 | 1790 | 3 1/2 x 5 1/2 | 34x5n | 34x5n | W | | | | | | | |
| | | | | | | | Pierce-Arrow.....5 | 5 | 4850 | 4 1/2 x 5 1/2 | 36x4 | 36x4d | W | Stoughton.....B | 1 1/2 | 2150 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | | | | | | | |
| | | | | | | | Pierce-Arrow.....3 1/2 | 3 1/2 | 4350 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Stoughton.....D | 2 | 2490 | 4 x 5 1/2 | 36x4 | 36x7 | W | | | | | | | |
| | | | | | | | Pierce-Arrow.....5 | 5 | 4850 | 4 1/2 x 5 1/2 | 36x5 | 40x6d | W | Stoughton.....F | 3 | 3150 | 4 1/2 x 5 1/2 | 36x5d | 36x5d | W | | | | | | | |
| | | | | | | | Pittsburgher.....1 1/2-2 | 3000 | 3 1/2 x 5 | 36x4 | 36x6 | | Sullivan.....E | 2 | 2800 | 4 1/2 x 5 1/2 | 36x1k | 36x7k | W | | | | | | | | |
| | | | | | | | Pittsburgher.....3 | 3 | 3800 | 4 1/2 x 5 1/2 | 36x5k | 36x7 | W | Sullivan.....H | 3 1/2 | 3750 | 4 1/2 x 6 | 36x5 | 36x5d | W | | | | | | | |
| | | | | | | | Power.....F | 2 | 3150 | 4 x 5 1/2 | 36x5 | 36x7 | W | | | | | | | | | | | | | | |
| | | | | | | | Power.....C | 3 1/2 | ..... | 4 1/2 x 5 1/2 | 36x5 | 40x10 | W | | | | | | | | | | | | | | |
| | | | | | | | Premcar.....B-143 | 1 1/2 | 2475 | 3 1/2 x 5 | 36x6n | 36x6n | W | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | *Thomart..... | 1 1/2 | 1795 | 4 x 5 1/2 | 34x5 | 34x5 | C | | | | | | | |
| | | | | | | | *Rainier.....R-21 | 3/4 | 1970 | 3 1/2 x 5 | 35x5n | 35x5n | W | Tiffin.....GW | 1 1/2 | 2100 | 4 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | | | | | | | |
| | | | | | | | Rainier.....R-29 | 1 | 2150 | 3 1/2 x 5 | 35x5n | 35x5n | W | Tiffin.....MW | 2 1/2 | 2700 | 4 1/2 x 5 1/2 | 36x4 | 36x3 1/2 | W | | | | | | | |
| | | | | | | | Rainier.....R-26 | 1 1/2 | 2490 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Tiffin.....PW | 3 1/2 | 3000a | 4 1/2 x 5 1/2 | 36x5 | 40x5d | W | | | | | | | |
| | | | | | | | Rainier.....R-28 | 2 | 2950 | 4 1/2 x 5 1/2 | 34x4 | 34x6 | W | Tiffin.....PW | 5 | 4300 | 4 1/2 x 6 | 36x6 | 40x6d | W | | | | | | | |
| | | | | | | | Rainier.....R-20 | 2 1/2-3 | 3550 | 4 1/2 x 5 1/2 | 34x4 | 34x7 | W | Titan.....2 | 2 | 4500 | 4 1/2 x 6 | | | | | | | | | | |

Specifications of Current Motor Truck Models—Continued

| NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | Final Drive |
|--------------------|---------------|---------------|-----------------|----------------|-------------|----------------|---------------|---------------|-----------------|----------------|-------------|------------------|---------------|---------------|-----------------|------------------|-------------|
| | | | | Front Rear | | | | | | Front Rear | | | | | | | |
| Veteran.....P** | 2 | \$3099 | 4 1/2 x 5 1/2 | 36x4 36x7 | W | White.....20 | 2 | \$3250 | 3 1/2 x 5 1/2 | 36x4k 36x7k | D | Wilcox.....AA | 1 | \$1900 | 3 1/2 x 5 1/2 | 36x4k 36x4k | W |
| Veteran.....R** | 3 | 4200 | 4 1/2 x 5 1/2 | 36x4 36x7 | W | White.....40 | 3 1/2 | 4200 | 3 1/2 x 5 1/2 | 36x5 40x5d | D | Wilcox.....BB | 1 1/2 | 2550 | 4 1/2 x 5 | 36x4 36x5 | W |
| Veteran.....S** | 4 | 5395 | 4 1/2 x 5 1/2 | 36x5 36x10 | W | White.....45 | 5 | 4500 | 4 1/2 x 5 1/2 | 36x6 40x6d | D | Wilcox.....D | 2 1/2 | 3000 | 4 1/2 x 5 | 36x4k 36x3 1/2 k | W |
| *Vim.....50 | 1 1/2 | 995 | 4 x 5 | 32x4n 32x4n | B | Wichita.....K | 1 | 1875 | 3 1/2 x 5 1/2 | 36x3 1/2 36x4k | W | Wilcox.....E | 3 1/2 | 3950 | 4 1/2 x 5 | 36x5k 36x5k | W |
| Walker-JohnsonA | 2 | 2500 | 3 1/2 x 5 | 34x3 1/2 34x6 | W | Wichita.....M | 2 | 2400 | 3 1/2 x 5 1/2 | 36x3 1/2 36x6k | W | Wilcox.....F | 5 | 4350 | 4 1/2 x 5 1/2 | 36x5 40x6d | W |
| Walker-JohnsonB | 3 | 3000 | 4 1/2 x 5 1/2 | 36x4 36x8 | W | Wichita.....RX | 3 | 3200 | 4 1/2 x 5 1/2 | 36x4k 36x8k | W | Wilson.....G | 1 1/2 | 2270 | 3 1/2 x 5 | 36x3 1/2 36x5 | W |
| Walter.....M | 2 1/2 | 3850 | 4 1/2 x 5 1/2 | 36x4 36x8 | D | Wichita.....O | 4 | 3500 | 4 1/2 x 5 1/2 | 36x5k 36x5k | W | Wilson.....EA | 2 1/2 | 2825 | 4 1/2 x 5 1/2 | 36x4 36x7 | W |
| Walter.....S | 5 | 4850 | 4 1/2 x 5 1/2 | 36x6 40x6d | W | | | | | | | Wilson.....G | 3 1/2 | 3685 | 4 1/2 x 5 1/2 | 36x5 36x5 | W |
| *Watson.....C | 1 | 1465a | 3 1/2 x 5 1/2 | 35x5n 35x5n | W | | | | | | | Wilson.....H | 5 | 4520 | 4 1/2 x 5 | 36x6 40x6 | W |
| Watson.....N | 3 1/2 | 4250 | 4 1/2 x 5 1/2 | 36x5 36x10 | W | | | | | | | *Wisconsin.....A | 1 | 1750 | 3 1/2 x 5 | 34x5n 34x5n | W |
| Western.....W1 1/2 | 1 1/2 | 2450 | 4 1/2 x 5 1/2 | 36x3 1/2 36x5k | W | | | | | | | Wisconsin.....B | 1 1/2 | 2100 | 3 1/2 x 5 | 35x5 36x6 | W |
| Western.....L1 1/2 | 1 1/2 | 2450 | 3 1/2 x 5 | 36x3 1/2 36x5k | W | | | | | | | Wisconsin.....C | 2 1/2 | 2700 | 4 x 5 1/2 | 36x6n 36x7 | W |
| Western.....W2 1/2 | 2 1/2 | 3250 | 4 1/2 x 5 1/2 | 36x4 36x7 | W | | | | | | | Wisconsin.....D | 3 1/2 | 3000 | 4 1/2 x 5 1/2 | 36x6n 40x8 | W |
| Western.....L2 1/2 | 2 1/2 | 2450 | 4 1/2 x 5 | 36x4 36x7 | W | | | | | | | Wisconsin.....E | 5 | 3500 | 4 1/2 x 5 1/2 | 36x6n 36x10 | W |
| Western.....W3 1/2 | 3 1/2 | 4000 | 4 1/2 x 5 | 36x5 40x5d | W | | | | | | | Wisconsin.....F | 7 | 4000 | 5 x 6 1/2 | 36x6 36x12 | W |
| *White.....15 | 1 1/2 | 2400 | 3 1/2 x 5 1/2 | 34x5n 34x5n | B | | | | | | | Witt-Will.....N | 1 1/2 | 2450 | 3 1/2 x 5 | 36x3 1/2 36x6k | W |
| | | | | | | | | | | | | Witt-Will.....P | 2 1/2 | 2900 | 4 1/2 x 5 1/2 | 36x4k 36x8k | W |

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.

r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.

Specifications of Current Farm Tractor Models

| TRADE NAME | Rating | Price | Wheels or Crawlers | Engine | Cylinders; Bore, Stroke | Fuel | Flow Capacity | TRADE NAME | Rating | Price | Wheels or Crawlers | Engine | Cylinders; Bore, Stroke | Fuel | Flow Capacity | TRADE NAME | Rating | Price | Wheels or Crawlers | Engine | Cylinders; Bore, Stroke | Fuel | Flow Capacity |
|------------------|---------|-------|--------------------|--------|-------------------------|-------|---------------|--------------------|---------|-------|--------------------|--------|-------------------------|-------|---------------|----------------------|---------|-------|--------------------|--------|-------------------------|-------|---------------|
| Allis-Chal.G.P. | 6-12 | \$205 | 2 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 1 | Gray..... | 18-36 | 1975 | 3 | Wauk. | 4-4 1/2 x 6 1/2 | Gas. | 4 | OilPull.....E | 30-60 | ..... | 4 | Own | 2-10x12 | K,D | 8-10 |
| Allis-Chalm. | 15-25 | 1185 | 4 | Midw. | 4-4 1/2 x 5 1/2 | Gas. | 3 | | | | | | | | | Oldsmar.....K | 2 1/2-5 | \$225 | 4 | Own | 1-5 1/2 x 5 1/2 | Gas. | 1 |
| Allis-Chalm. | 20-35 | 1885 | 4 | Own | 4-4 1/2 x 6 1/2 | GorK | 3-4 | | | | | | | | | | | | | | | | |
| Allwork.....2-G | 14-28 | 1595 | 4 | Own | 4-4 1/2 x 6 | GorK | 3 | | | | | | | | | | | | | | | | |
| Allwork.....C | 14-28 | 1293 | 4 | Own | 4-5 x 6 | GorK | 3 | | | | | | | | | | | | | | | | |
| *ARO.1921-22 | 3-6 | 385 | 4 | Own | 1-4 1/2 x 5 1/2 | Gas. | 1 | Hart-Parr.....20 | 20 | ..... | 4 | Own | 2-5 1/2 x 6 1/2 | K,D | 2 | | | | | | | | |
| Aultman-T..... | 15-30 | ..... | 4 | Clim. | 4-5 x 6 1/2 | G,K,D | 4 | Hart-Parr.....30 | 30 | ..... | 4 | Own | 2-6 1/2 x 7 | K,D | 3 | Pioneer.....C | 18-36 | ..... | 4 | Own | 4-5 1/2 x 5 | G,K,D | 4 |
| Aultman-T..... | 22-45 | ..... | 4 | Own | 4-5 1/2 x 6 | G,K,D | 6 | Hart-Parr.....D | 9-16 | 628 | 4 | Own | 4-4 1/2 x 6 1/2 | K,D | 2 | Pioneer.....C | 40-75 | ..... | 4 | Own | 4-7 x 5 | Gas. | 10 |
| Aultman-T..... | 30-60 | ..... | 4 | Own | 4-7 x 9 | G,K | 5-10 | Heider.....C | 12-20 | 725 | 4 | Wauk. | 4-4 1/2 x 6 1/2 | G,K | 3 | | | | | | | | |
| Avery,S.R.Cul | 5-10 | ..... | 4 | Own | 4-3 x 4 | G,K | ..... | Heider.....Cult | 5-10 | ..... | 4 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 1 | | | | | | | | |
| Avery Cult-C | ..... | ..... | 3 | Own | 6-3 x 4 | G,K | ..... | Huber Light 4 | 12-25 | 985 | 4 | Wauk. | 4-4 1/2 x 6 1/2 | GorK | 3 | | | | | | | | |
| Avery.....C | ..... | ..... | 4 | Own | 6-3 x 4 | G,K | ..... | Huber Super 4 | 15-30 | ..... | 4 | Midw. | 4-4 1/2 x 6 | Gas. | 3 | Russell..... | 12-24 | ..... | 4 | Own | 4-4 1/2 x 5 1/2 | GorK | 2-3 |
| Avery..... | 12-25 | ..... | 4 | Own | 4-4 x 5 1/2 | G,K,D | 3-4 | | | | | | | | | Russell..... | 15-30 | ..... | 4 | Own | 4-5 1/2 x 5 | GorK | 3-4 |
| Avery..... | 14-28 | ..... | 4 | Own | 4-4 1/2 x 7 | G,K,D | 3-4 | | | | | | | | | Russell..... | 20-35 | ..... | 4 | Own | 4-6 1/2 x 7 | GorK | 4-5 |
| Avery..... | 18-30 | ..... | 4 | Own | 4-5 1/2 x 6 | G,K,D | 4-5 | | | | | | | | | Russell..... | 30-60 | ..... | 4 | Own | 4-8 x 10 | GorK | 8-10 |
| Avery..... | 25-60 | ..... | 4 | Own | 4-6 1/2 x 7 | G,K,D | 5-6 | | | | | | | | | | | | | | | | |
| Avery..... | 45-65 | ..... | 4 | Own | 4-7 1/2 x 8 | G,K,D | 8-10 | International..... | 8-16 | ..... | 4 | Own | 4-4 1/2 x 5 | G,K,D | 2 | | | | | | | | |
| | | | | | | | | Internat.Titan | 10-20 | ..... | 4 | Own | 2-6 1/2 x 8 | G,K,D | 3 | | | | | | | | |
| | | | | | | | | International..... | 15-30 | ..... | 4 | Own | 4-5 1/2 x 8 | G,K,D | 4 | | | | | | | | |
| Bates All-Stid | 15-25 | ..... | 4 | Own | 4-4 1/2 x 6 | Gas. | 3 | | | | | | | | | Shaw-Enochs (Grader) | ..... | ..... | 2 | LeRoi | 4-3 1/2 x 4 1/2 | Gas. | ..... |
| Bates Mule.....H | 15-25 | ..... | 4 | Midw. | 4-4 1/2 x 5 1/2 | Gas. | 3 | | | | | | | | | | | | | | | | |
| Bates Mule.....F | 15-25 | ..... | 4 | Midw. | 4-4 1/2 x 5 1/2 | Gas. | 3 | *Kinkade..... | 1 1/2-3 | 100 | 1 | Own | 1-3 x 3 | Gas. | ..... |  |  |  |  |  |  |  |  |
| Bates Mule.....G | 25-35 | ..... | 4 | Midw. | 4-4 1/2 x 6 | Gas. | 4 | | | | | | | | | | | | | | | | |
| Beav..... | 25-35 | ..... | 4 | Ste. | 4-4 1/2 x 6 1/2 | Gas. | 4 | | | | | | | | | ToroTractor'22 | 6-10 | 675 | 3 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 2 |
| *Beeman Jr..... | 2 1/2-4 | 180 | 2 | B&S | 1-2 1/2 x 2 1/2 | Gas. | 4 | | | | | | | | | Townsend..... | 10-20 | 800 | 2 | Own | 4-6 1/2 x 7 | Ker. | 2-3 |
| *Beeman.....G | 2-4 | 240 | 4 | Own | 1-3 1/2 x 4 1/2 | Gas. | 4 | La Crosse..... | 6-12 | ..... | 4 | Own | 2-4 x 6 | G,K | 1 | Townsend..... | 15-30 | 1350 | 2 | Own | 4-7 x 8 | Ker. | 3-4 |
| Best.....30 | 18-30 | ..... | 2 | Own | 4-4 1/2 x 6 1/2 | G,K,D | 4 | La Crosse..... | 12-24 | ..... | 2 | Own | 2-6 x 7 | G,K | 3 | Townsend..... | 25-50 | 2500 | 2 | Own | 4-8 1/2 x 10 | Gas. | 4-8 |
| Best.....60 | 35-65 | ..... | 2 | Own | 4-5 1/2 x 6 1/2 | G,K,D | 8-9 | Lauson.....5 | 12-25 | 1295 | 4 | Midw. | 4-4 1/2 x 6 1/2 | Gas. | 3 | Traylor.....TB | 6-12 | 500 | 4 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 1-2 |
| *Belens..... | 18-30 | ..... | 4 | B&S | 1-2 1/2 x 4 1/2 | G,K | 8-9 | Lauson.....21 | 15-30 | 1675 | 4 | Beav. | 4-4 1/2 x 6 | GorK | 3-4 | TwinCity..... | 12-20 | ..... | 4 | Own | 4-4 1/2 x 6 | H,K | 3 |
| *Bryan..... | 18-30 | 2800 | 4 | Own | 1-2 1/2 x 4 1/2 | G,K | 3 | Leader.....N | 18-32 | ..... | 4 | Own | 4-5 x 6 | G,K | 3-4 | TwinCity..... | 20-35 | ..... | 4 | Own | 4-5 1/2 x 6 1/2 | G,K | 5-6 |
| | | | | | | | | Leader.....B | 16-32 | ..... | 4 | Clim. | 4-5 x 6 | G,K | 3-4 | TwinCity..... | 40-65 | ..... | 4 | Own | 4-7 1/2 x 9 | G,K | 8-10 |
| | | | | | | | | Leader.....GU | 18-35 | ..... | 2 | Clim. | 4-5 x 6 | G,K | 3-4 | | | | | | | | |
| Case..... | 12-30 | 1250 | 4 | Own | 4-4 1/2 x 5 | G,K,D | 2-3 | Lincoln..... | 15-30 | 1600 | 2 | Buda | 4-4 1/2 x 6 | G,K | 3 | Uncle SamC20 | 12-20 | 1235 | 4 | Weid. | 4-4 x 5 1/2 | G | 2-3 |
| Case..... | 15-27 | 1490 | 4 | Own | 4-4 1/2 x 6 | G,K,D | 3-4 | Little Giant.....B | 16-22 | ..... | 4 | Own | 4-4 1/2 x 5 | K | 4 | Uncle SamB19 | 20-30 | 1985 | 4 | Beav. | 4-4 1/2 x 6 | GorK | 3-4 |
| Case..... | 22-40 | 2650 | 4 | Own | 4-5 1/2 x 6 1/2 | G,K,D | 4-5 | Little Giant.....A | 20-35 | ..... | 2 | Wise. | 6-8 1/2 x 7 | Gas. | 16 | Uncle SamD21 | 20-30 | 1985 | 4 | Beav. | 4-4 1/2 x 6 | GorK | 3-4 |
| Case..... | 40-72 | 5200 | 4 | Own | 4-6 1/2 x 7 | G,K,D | 8-10 | Lombard. 1922 | 100 | ..... | 2 | Wise. | 6-8 1/2 x 7 | Gas. | 16 | Utilitor.....501 | 2 1/2-4 | 295 | 4 | Own | 1-3 1/2 x 4 1/2 | G | 1 |
| Caterpillar T11 | 25 | ..... | 2 | Own | 4-4 1/2 x 6 | Gas. | 4 | | | | | | | | | Utilitor.....501A | 2 1/2-4 | 340 | 4 | Own | 1-3 1/2 x 4 1/2 | G | 1 |
| Caterpillar T16 | 40 | ..... | 2 | Own | 4-4 1/2 x 7 | Gas. | 6 | MerryGar1922 | 2 | 210 | 2 | Evin | 1-2 1/2 x 2 1/2 | Gas. | ..... | Wallis.....K | 15-25 | ..... | 4 | Own | 4-4 1/2 x 5 1/2 | G,K | 3 |
| Centaur..... | 5-2 1/2 | 345 | 2 | N Way | 2-2 1/2 x 5 | GorK | 1 | Minne.....All-P | 12-25 | ..... | 4 | Own | 4-4 1/2 x 7 | GorK | 3-4 | Waterloo.....N | 12-25 | 675 | 4 | Own | 2-6 1/2 x 7 | Ker. | 3 |
| Cletrac.....F | 9-16 | ..... | 2 | Own | 4-3 1/2 x 4 1/2 | G,K,D | 2 | Minne.....Gas-P | 17-30 | ..... | 4 | Own | 4-4 1/2 x 7 | GorK | 5-6 | Wetmore21-22 | 12-25 | 1185 | 4 | Wauk. | 4-4 x 5 1/2 | G,K | 3 |
| Cletrac.....W | 12-20 | ..... | 2 | Own | 4-4 x 5 1/2 | G,K,D | 2-3 | Minne.....Med.D | 22-44 | ..... | 4 | Own | 4-7 1/2 x 9 | GorK | 8-9 | Wisconsin.....E | 16-30 | 1750 | 4 | Clim. | 4-5 x 6 1/2 | GorK | 3 |
| Do-It-All.....A | 3-6 | 495 | ..... | Own | 1-4 1/2 x 5 | Gas. | 1 | MinneHeavyD | 35-70 | ..... | 4 | Own | 4-7 1/2 x 9 | GorK | 8-9 | Wisconsin.....H | 22-40 | 2550 | 4 | Clim. | 4-5 1/2 x 7 | GorK | 4-6 |
| Do-It-All, Jack | 6 | 395 | ..... | Own | 1-3 1/2 x 3 1/2 | Gas. | 1 | Moline Univ D | 9-18 | 650 | 2 | Own | 4-3 1/2 x 5 | Gas. | 2-3 | Yuba.....15-25 | 15-25 | 2750 | 2 | Wise. | 4-4 1/2 x 6 | G,K,D | ..... |
| Do-It-All.....6 | 12 | 495 | 2 | Own | 2-3 1/2 x 5 1/2 | Gas. | 1 | Moline Orch. | 9-18 | ..... | 2 | Own | 4-3 1/2 x 5 | Gas. | 2-3 | Yuba.....25-40 | 25-40 | 4250 | 2 | Wise. | 4-5 1/2 x 7 | G,K,D | ..... |
| | | | | | | | | Monarch..... | 20-30 | ..... | 2 | Beav. | 4-4 1/2 x 6 | G,K,D | 4 | | | | | | | | |
| Eagle.....F | 12-22 | ..... | 4 | Own | 2-7 x 8 | GorK | 3-4 | NB.....1 | 3-6 | 375 | 4 | Own | 2-3 1/2 x 4 | Gas. | 1 | | | | | | | | |
| Eagle.....H | 16-30 | ..... | 4 | Own | 2-8 x 8 | GorK | 4-5 | Nichols-Shep. | 20-42 | 2650 | 4 | Own | 2-8 x 10 | GorK | 3-6 | | | | | | | | |
| E-H.....AA | 12-20 | ..... | 4 | Own | 4-4 1/2 x 5 | G,K,D | 3 | Nichols-Shep. | 25-50 | 3000 | 4 | Own | 2-9 x 12 | GorK | 4-8 | | | | | | | | |
| E-H.....Q | 12-20 | ..... | 4 | Own | 4-4 1/2 x 5 | G,K,D | 3 | Nichols-Shep. | 35-70 | 3650 | 4 | Own | 2-10 1/2 x 14 | GorK | 8-12 | | | | | | | | |
| E-B..... | 16-32 | ..... | 4 | Own | 4-5 1/2 x 7 | G,K,D | 4 | | | | | | | | | | | | | | | | |
| Fageol.....D | 9-18 | ..... | 4 | Lyc. | 4-3 1/2 x 5 | Gas. | 2 | | | | | | | | | | | | | | | | |
| Fordson..... | 18 | 395 | 4 | Own | 4-4 x 5 | G,K | 2 | OilPull.....K | 12-20 | ..... | 4 | Own | 2-6 x 8 | K,D | 3 | | | | | | | | |
| Frick.....A | 12-20 | ..... | 4 | Erd. | 4-4 x 6 | G,K | 2-3 | OilPull.....H | 16-30 | ..... | 4 | Own | 2-7 x 8 1/2 | K,D | 4 | | | | | | | | |
| Frick.....C | 15-28 | ..... | 4 | Beav. | 4-4 1/2 x 6 | G,K | 3-4 | OilPull.....G | 20-40 | ..... | 4 | Own | 2-8 x 10 | K,D | 5-6 | | | | | | | | |

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Flow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Marks: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Here.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidey. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows. *Track Runner. †Industrial Tractor. ‡Garden Tractor. *Steam Tractor.



CADILLAC

EXCEPT for occasional careful additions, the ranks of the Cadillac dealer organization remain virtually unchanged. Cadillac dealers are entirely satisfied with their franchise and the Company is frankly proud of its representatives.

CADILLAC MOTOR CAR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

S T A N D A R D O F T H E W O R L D



"Cheapness" and "Poor Service" Go Hand in Hand

THE ONE and only so-called "justification" for imitation, or "pirate", service parts is "cheapness".

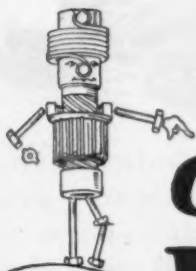
But it is always "cheapness" at a sacrifice of *quality*.

Thus all imitation, or "pirate", parts are condemned by the very "cheapness" which is their one and only chance to find a market.

An imitation is, frankly, something not as good as the original which it vainly apes. The "pirate" part is a mere imitation of a genuine part—and is a foe to the honest service and good-will which every dealer and garage man knows are the real foundation of his success and profit in business.

None but a genuine Bendix replacement part can possibly give honest and satisfactory service in The Bendix Drive.

CAUTION: In our Bendix Drive advertisements, now appearing regularly each month in The Saturday Evening Post and The Literary Digest, the public is being cautioned to buy none but *genuine* service parts.



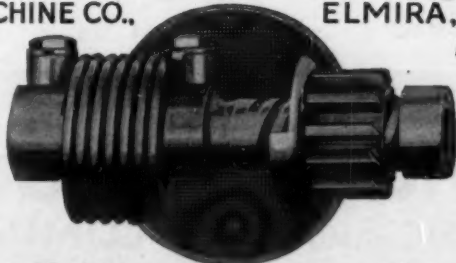
It pays to sell none but
GENUINE PARTS
FOR
BENDIX DRIVE

ECLIPSE MACHINE CO.,

ELMIRA, NEW YORK

Detroit Office:
1342 Book Bldg.

Eclipse Machine Co., Limited
Walkerville, Ontario

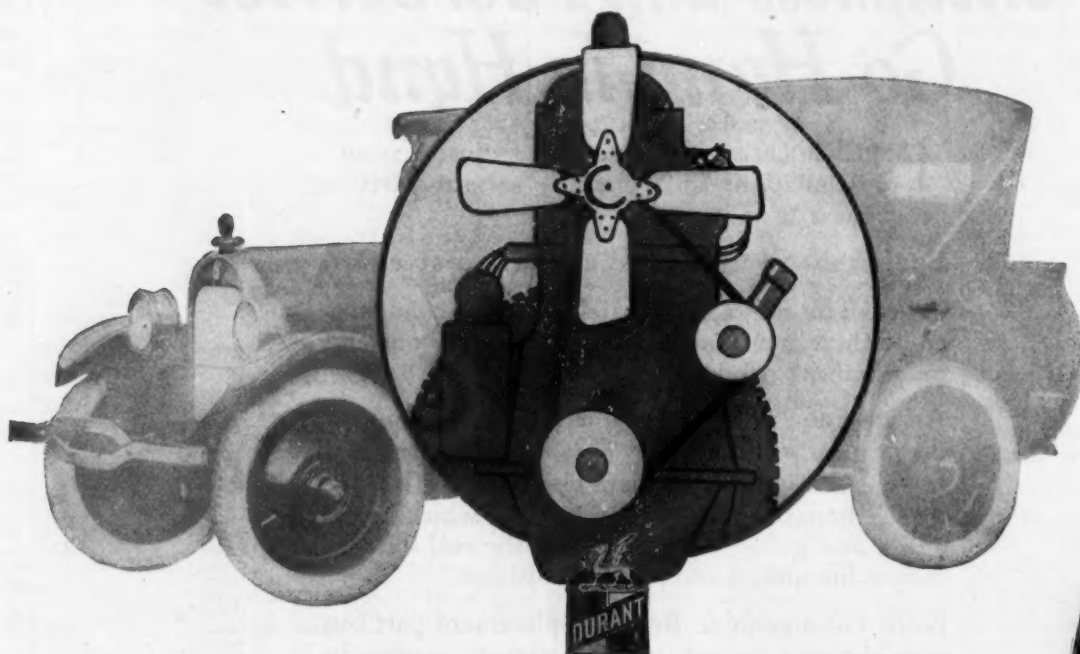


Standard Equipment on more than 90%
of the World's Automobiles and Trucks.

STRAIGHTLINE

ENDLESS FAN BELTS

No. 645 for DURANT FOUR—Model A-22



NOT only is there a STRAIGHT-LINE Endless Fan Belt specifically adapted to the fan drive of the Durant, but there is a specialized STRAIGHTLINE belt for *every* type of automotive drive.



Permanite Transmission Lining for Fords never loses its firm, velvety grip.

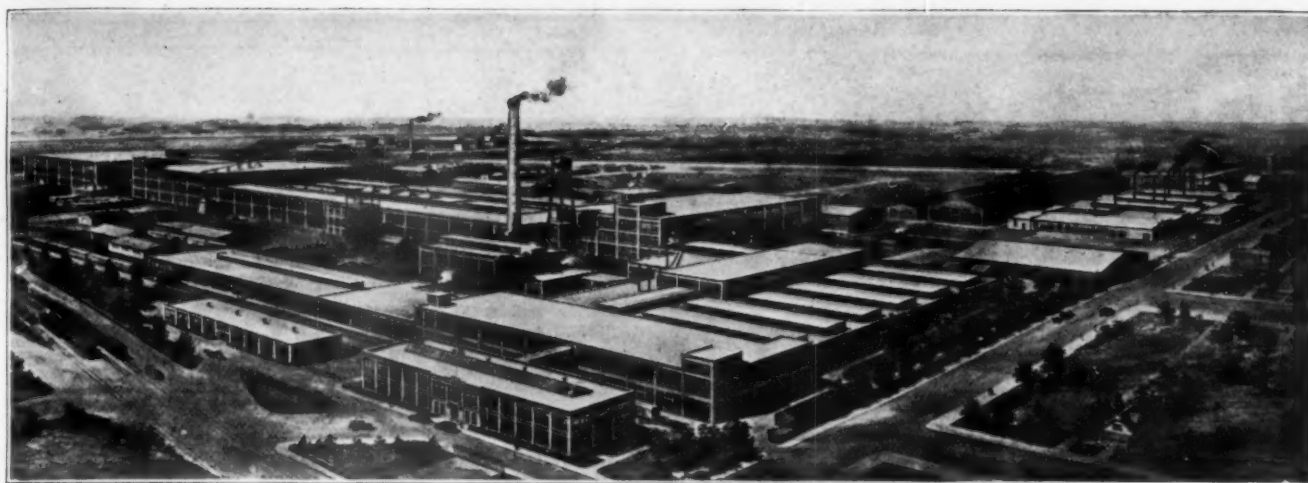
MILLS
NEWARK, N.J.

Rosendale-Reddaway

BELTING AND HOSE COMPANY

SOLE MANUFACTURERS OF "CAMEL HAIR" BELTING

GENERAL SALES OFFICE
WOOLWORTH BLDG. NEW YORK



What the name Prest-O-Lite means is concretely shown by the great Prest-O-Lite factory at Indianapolis, its forty-six acres in the site and sixteen acres of floor space for manufacturing.

Prest-O-Lite

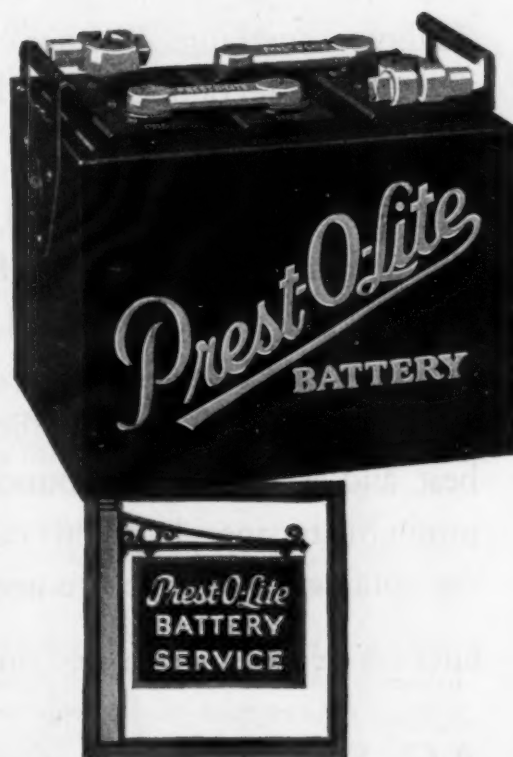
THE OLDEST SERVICE TO MOTORISTS

Why the Prest-O-Lite plant grew to this size

The great Prest-O-Lite factory provides every modern facility for scientific tests and inspections to insure the proper quality of the battery. It is what it is today because automobile makers and users know and insist on the quality of product and quality of performance which is back of the Prest-O-Lite name.

Here the whole battery is made, from Prest-O-Plates—the plates that are so dependable because they combine the necessary hardness with ample porosity—to the last detail. Because of these advantages Prest-O-Lite Batteries maintain their reputation as the best all-around, all-weather batteries made.

Because Prest-O-Lite is “the oldest service to motorists,” the Prest-O-Lite Service Station sign is one that is looked for with confidence in the dealings it invites.



Be a more prosperous dealer
Battery stations, service garages, automobile dealers and others who are live merchandisers and interested in having a prosperous, permanent business are invited to write us for our distributor proposition and plan.

THE PREST-O-LITE COMPANY, Inc., Indianapolis, Indiana

New York Office: 30 East 42nd Street

Pacific Coast Office: 599 Eighth Street, San Francisco

In Canada: Prest-O-Lite Company of Canada, Ltd., Toronto

What Concentration Means in Merchandising!

The accessory business is now so established that the dealer is in a position to know positively which are the safe and permanent lines to handle.

A merchant should not gamble with his biggest asset—satisfied customers—by selling untried or doubtful quality in anything. Neither can he consistently recommend one brand one day and another the next.

The successful merchant in all fields concentrates his business on the nationally known, well advertised lines, selecting the leader in each field. He then knows that he is selling the best and is building a sound and profitable business by rightly earning the confidence of his customers.

Success begets success and only by

handling the lines that are in the lead, year after year, will the dealer put his business in a class reflecting that same leadership.

For fifteen years AC's have been making friends, until today there are millions of motorists who will have no other plugs, and other owners are fast realizing that AC is the safe plug to use.

Read the opposite page which shows why AC is the plug with the greatest sales possibilities, both present and future. It is the best advertised, most profitable and easiest selling plug.

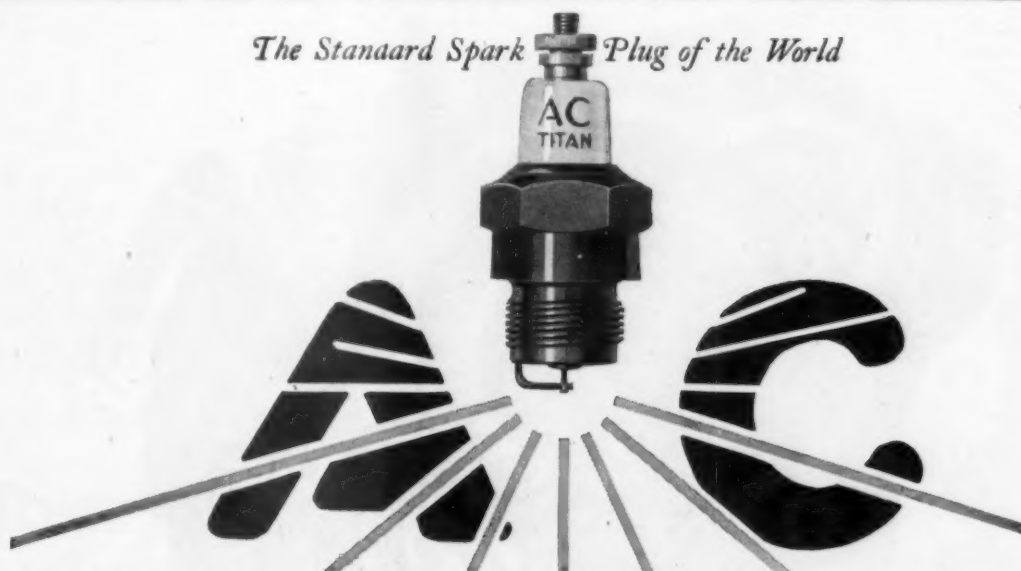
These facts prove that so far as spark plugs are concerned, AC is the logical line upon which you should concentrate.

AC Spark Plug Company, FLINT, *Michigan*

U. S. Pat. No. 1,135,727, April 13, 1915, U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending

S e l l A C S p a r k

The Standard Spark Plug of the World



Just Consider How Many AC-Equipped Cars There Are in Your Locality!

Think of all the Chevrolets—they have always been AC equipped.

—*all the Buicks*—AC equipped for fourteen years.

—*all the Dodge Brothers*—have never used anything but AC.

—*all the Nash Cars*—always AC equipped.

—*Oaklands*—for the past fourteen years AC equipped.

—*all the Overlands*—AC equipped for years.

—*and all the other cars:* Apperson, Cadillac, Chalmers, Chandler, Cleveland, Cole, Dort, Durant, Essex, Haynes, Hudson, Hupmobile, Jewett, Jordan, Marmon, Maxwell, Mitchell, Oldsmobile, Paige, R. & V. Knight, Star—*and more than two hundred others:*

—all AC equipped and already in use in your locality.

This tremendous ready-made market for AC's is right at your door and will always be there in ever-increasing size.

Chevrolet is making over 2,000 cars a day
Buick is turning out over 700 a day

Dodge Brothers are making over 700 a day

Durant and Star over 500 cars a day

Willys-Overland over 400 cars a day

ALL AC EQUIPPED.

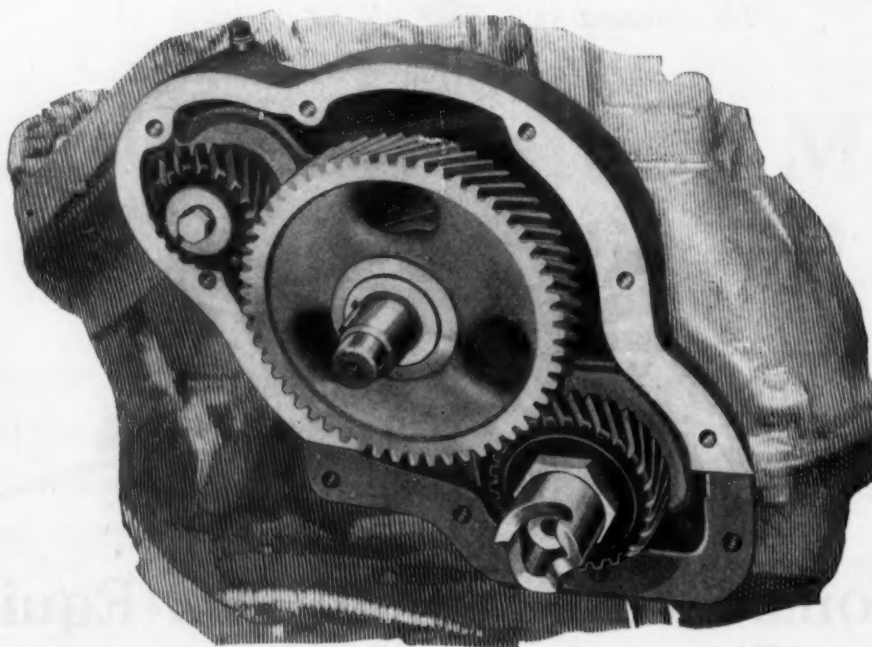
Then add all the others and just visualize the enormous production, every day, of cars factory-equipped with AC plugs. Each day the demand for AC's grows bigger.

And for your Ford business there is the AC 1075—the better plug for Ford engines. The plug that insures you a good margin of profit, has unusual selling features, makes satisfied customers and is backed up by the AC trademark and reputation. Read carefully AC 1075 advertisement also appearing in this issue.

Also with the AC Carbon Proof now made in all sizes, you have the most successful plug ever devised for motors that have a tendency to foul spark plugs.

To be successful today, competitive lines must be reduced and turnover increased. The AC possibilities enumerated above prove that AC is the logical line of spark plugs upon which you should concentrate.

Plugs by the Set



Installation showing
Celoron crankshaft
and generator shaft
gears.

Is there any excuse for noisy gears?

THE soft, even purr of the perfectly-running, practically noiseless motor is a delight to the man who buys the car you make. But alien noises which develop with continuous service turn this harmony into discord.

There is no reason why any motorist should have to listen to the grindings, whirrings or growlings which come in time from all-metal timing gears. You and every other car manufacturer can eliminate them by putting in all future cars gears that are silent.

Celoron Silent Timing Gears like those shown in the illustration are non-metallic and silent. They are composed of layers of vulcanized woven fabric thoroughly impregnated with a phenolic condensa-

tion resin of the highest quality. The finished gears have great strength and are water-, grease-, and oil-proof.

Although Celoron Gears are hard and strong, they have the resiliency to absorb the shocks of the road and cushion contact. Thus, they lengthen the life of steel mating gears.

Celoron Gears can be adapted to any timing gear train. They insure silence and retain perfect timing of the gear drive at all times. These qualities have been so thoroughly and conclusively proved that on many of America's quality motor cars they are standard equipment.

Write us for further information concerning Celoron Silent Timing Gears.

Diamond State Fibre Company

BRIDGEPORT

(near Philadelphia)

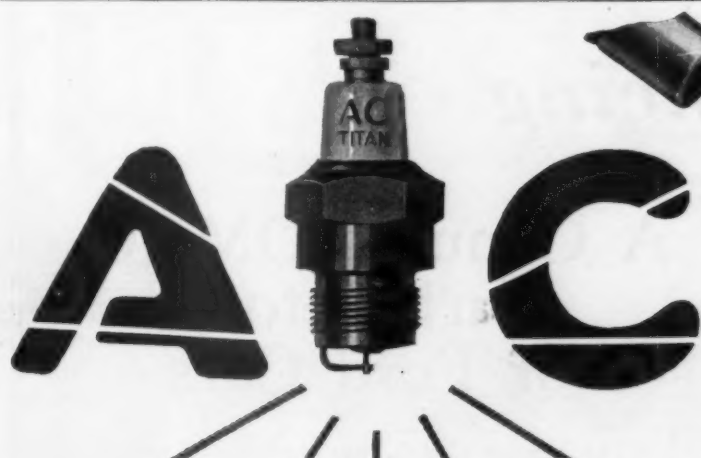
PENNSYLVANIA

Offices in Principal Cities

In Canada: Diamond State Fibre Company of Canada, Limited, 245 Carlaw Avenue, Toronto

TO CAR OWNERS: Perhaps your present timing gears have lost their silent qualities. If so, have your service station or repair men replace them with Celoron Silent Timing Gears. You'll be able to forget they are in your car.

CONDENSITE
CELORON
SILENT TIMING GEARS



How you can get the most business from Ford drivers!

There are a large number of Fords in your locality and most of them need spark plugs frequently. The only way for you to get a lion's share of this enormous replacement business is by offering something better. No Ford driver is interested in changing brands unless he gets better plugs, but for these he is looking—AC 1075's are not only better, they are the best.

They may sell for a trifle more than ordinary plugs for Fords, but built as they are to end most motor ills, they are more than worth the difference, and they afford you a fair margin of profit.

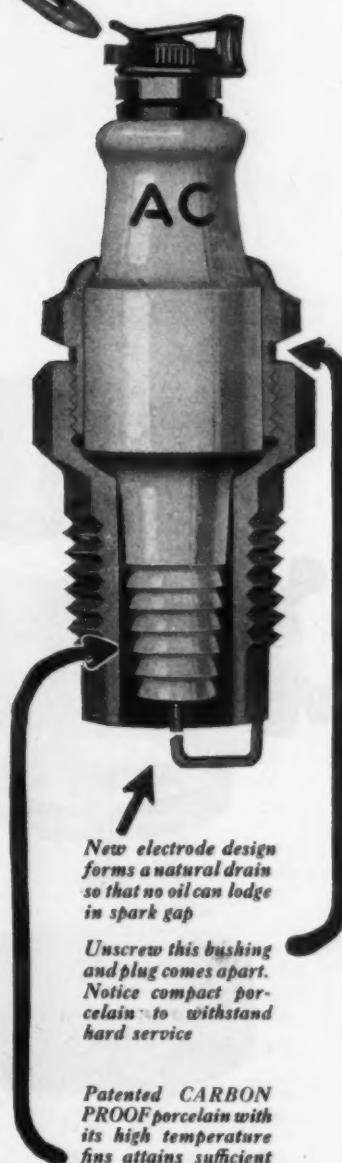
You can, therefore, replace at a good profit the plugs on Fords, simply by showing their drivers why AC 1075's—as illustrated—have the biggest advantages of any plugs ever made for the requirements of Ford engines.

A nation-wide advertising campaign has been started and will be carried on throughout the year to tell Ford owners everywhere of this better plug for Ford engines.

Put an AC 1075 Quick Seller on your counter. It makes a special department of your Ford plug business, holds your stock conveniently, ties up with AC national advertising and acts as a constant reminder to the Ford driver that AC 1075's are the plugs he should use.

You are overlooking the biggest field of profit in spark plug selling if you are not yet pushing AC 1075's among Ford drivers.

Spring terminal clip permits wire to be instantly detached and reconnected while motor is running. Facilitates testing spark plug and coil. No nut to be unscrewed or lost



New electrode design forms a natural drain so that no oil can lodge in spark gap

Unscrew this bushing and plug comes apart. Notice compact porcelain to withstand hard service

Patented CARBON PROOF porcelain with its high temperature fins attains sufficient heat to burn oil deposits, thus offering effective resistance to carbon

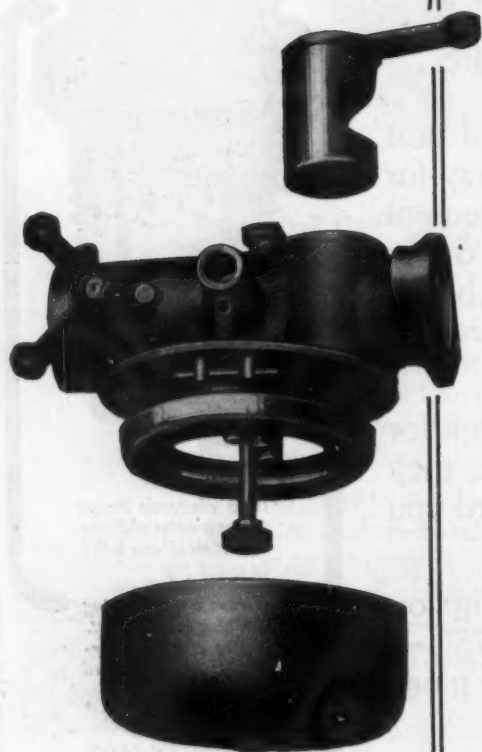


AC Spark Plug Company, FLINT, Michigan

U. S. Pat. No. 1,135,727, April 13, 1915, U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending

Announcing

A Genuine OMAC Carburetor for Ford Cars



Price: \$9.50

The regular OMAC has during the past few years become the accepted favorite of wealthy motorists, driving high priced cars. Even on these outstanding examples of mechanical excellence the OMAC has never failed to show a definite improvement.

Obviously, therefore, the owner of popular priced cars have found in the OMAC the nearest possible approach to a perfect utilization of fuel—even in face of the poor grade of gasoline now on sale.

This new model for FORDS incorporates the OMAC principles and the OMAC high standard of performance and economy of operation.

All the extraordinary efficiency of the larger OMACS—with special application to Ford requirements. Light, simple, easily installed.

It requires no extra devices for its operation, but is self-contained, compact, complete, with positive mechanical action.

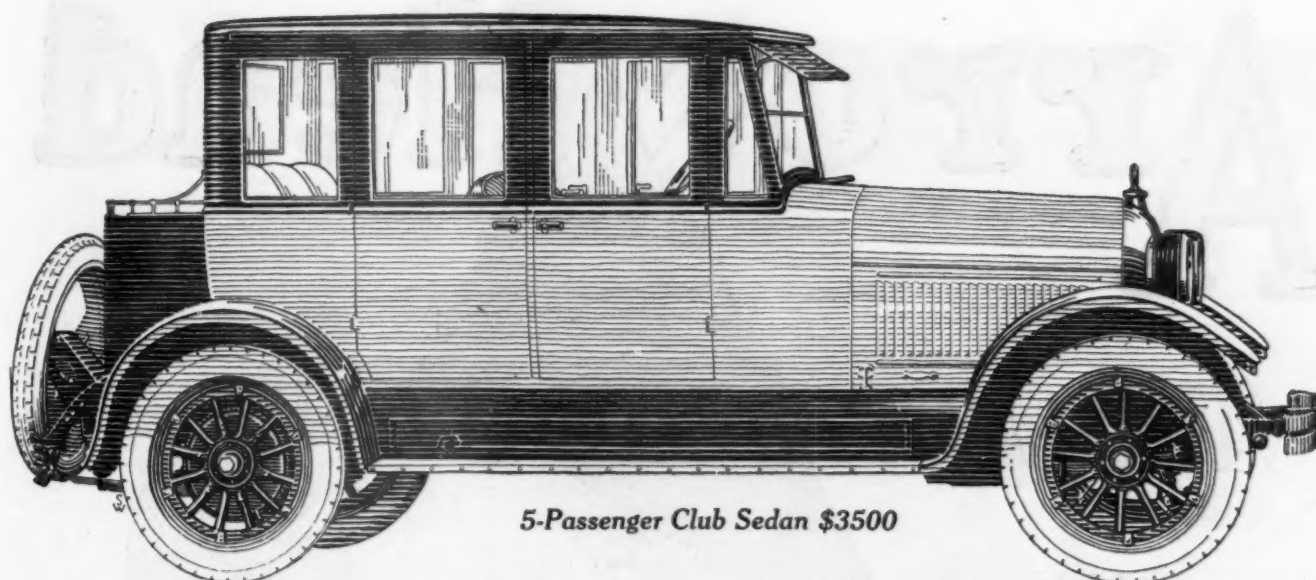
- | | |
|--|---|
| 1. Efficient at all altitudes in all seasons. | immediately apparent. |
| 2. Extraordinary efficiency at low speeds. | 6. Quickly and easily cleaned. |
| 3. Instantaneous response to throttle. | 7. Utter simplicity of design. No springs, tensions or trick devices. |
| 4. Only fully evaporated gasoline at all speeds. | 8. Not only multi-jet but multi-unit—with only one adjustment. |
| 5. Marked fuel economy—definitely and | |

*An Exceptional Opportunity
for Live Dealers.*

Write for Territory.

Omac
constant-unit
carburetor

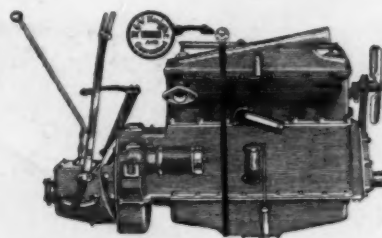
THE JENNINGS CORPORATION, PITTSBURGH, PA.
404 N. Richland St., Homewood Station



OUR 5-passenger Club Sedan is now ready for dealers. This car was generally conceded by the public to be the distinctive leader at the big automobile shows.

Even to such refinements as fitted suit cases in the rear compartment, every accessory that the discriminating motorist desires, is provided.

Engine Sealed and Guaranteed for TWO YEARS



If you have not yet investigated the new marketing plan made possible by the guarantee which frees you from engine servicing expense, it is worth your while to do so.

Without tying up capital in stock cars, the plan allows you to sell the R&V Knight Six at a clean net profit to yourself. Write for details.
R&V Motor Company, *East Moline, Ill.*

R&V Knight Six

"EVERLASTING PERFORMANCE"

Baltimore, Md., 1718-20 North Charles Street
Boston, Mass., 872 Commonwealth Avenue
Chicago, Ill., 2247 South Michigan Avenue

BRANCHES:
Cincinnati, Ohio, 813-817 Main Street
Cleveland, Ohio, 2122 Euclid Avenue

Kansas City, Mo., 1908-10 McGee Trafficway
New York City, 38-40 West 62nd Street
New Haven, Conn., 71 Whitney Avenue

FILL IN AND MAIL TODAY

R & V MOTOR COMPANY,
East Moline, Illinois

Gentlemen:—Kindly give me full information how I may sell the R&V Knight for a net profit, without obligating myself.

Name.....

Address.....

City..... State.....

M.A.

Arrow Head

ACCURATE




Arrow Head Piston Pins are perfectly round and perfectly straight. Made from solid bar stock S. A. E. specification. Soft cone. Surface case hardened uniformly at all points. Each pin is tested on amplifying gauges and thrown out if there is the slightest variance in accuracy.

The "Arrow Head" is Your Guarantee

Products

SKILL

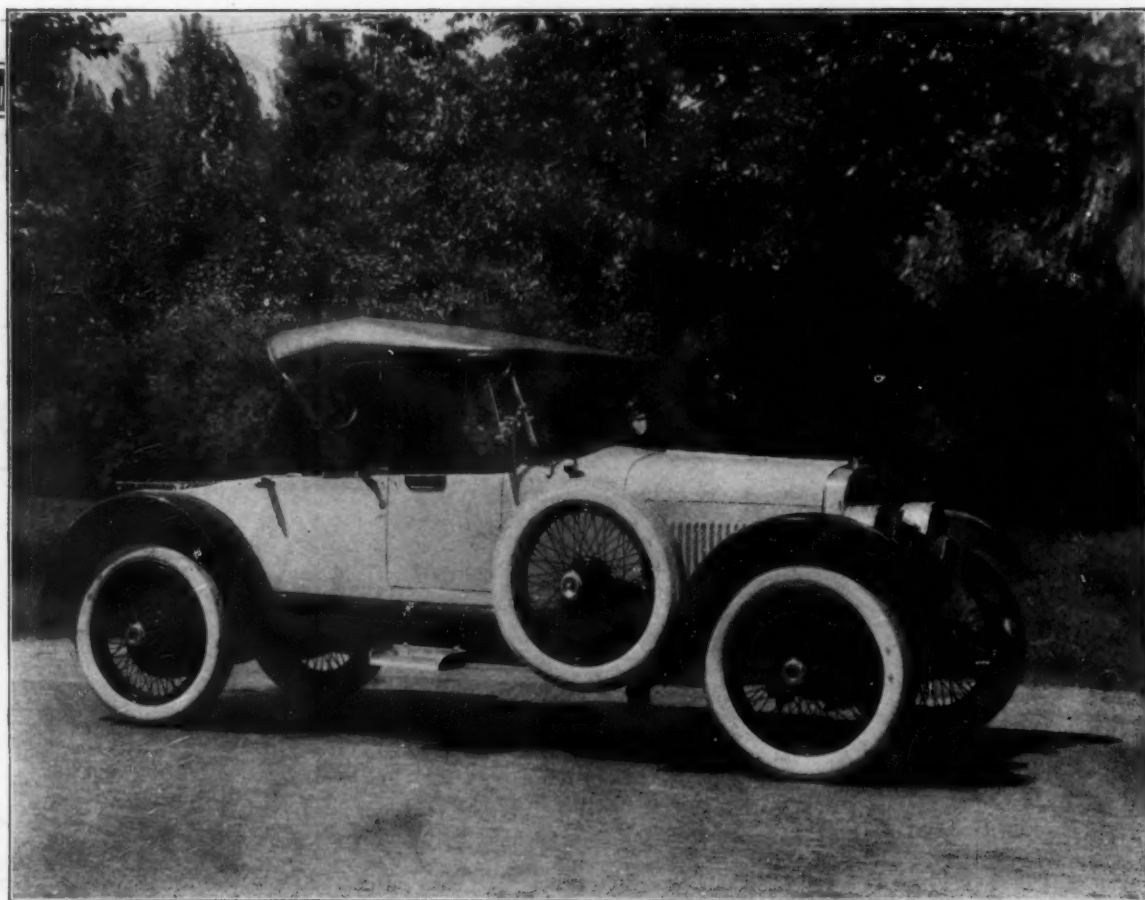


Arrow Head engineers and mechanics build well because they are experienced and practical. Arrow Head products are built in the largest factory in the world devoted exclusively to the manufacture of Pistons, Piston Pins and Axle and Drive Shafts. Specially designed machinery. Rigid inspection.

ARROW HEAD STEEL PRODUCTS CO.
MINNEAPOLIS, MINNESOTA

General Sales Offices,
616 S. Michigan Ave.,
Chicago, Ill.

Let "Arrow Head" be Your Business Builder



The Four Roadster

H. C. S. Reputation,

When your prospects can hear nothing but good about the car you sell and the reputation of its builder has been impressed on the public mind by years of the most satisfactory kind of publicity, there is no handicap on your sales effort.

The H. C. S. car built by Harry C. Stutz possesses a background that is good. Every year of the past twenty-four has brought more public appreciation of the uncommon ability of Harry C. Stutz as a designer and builder of the finest motor cars.

H. C. S.

DESIGNED AND BUILT BY HARRY C. STUTZ

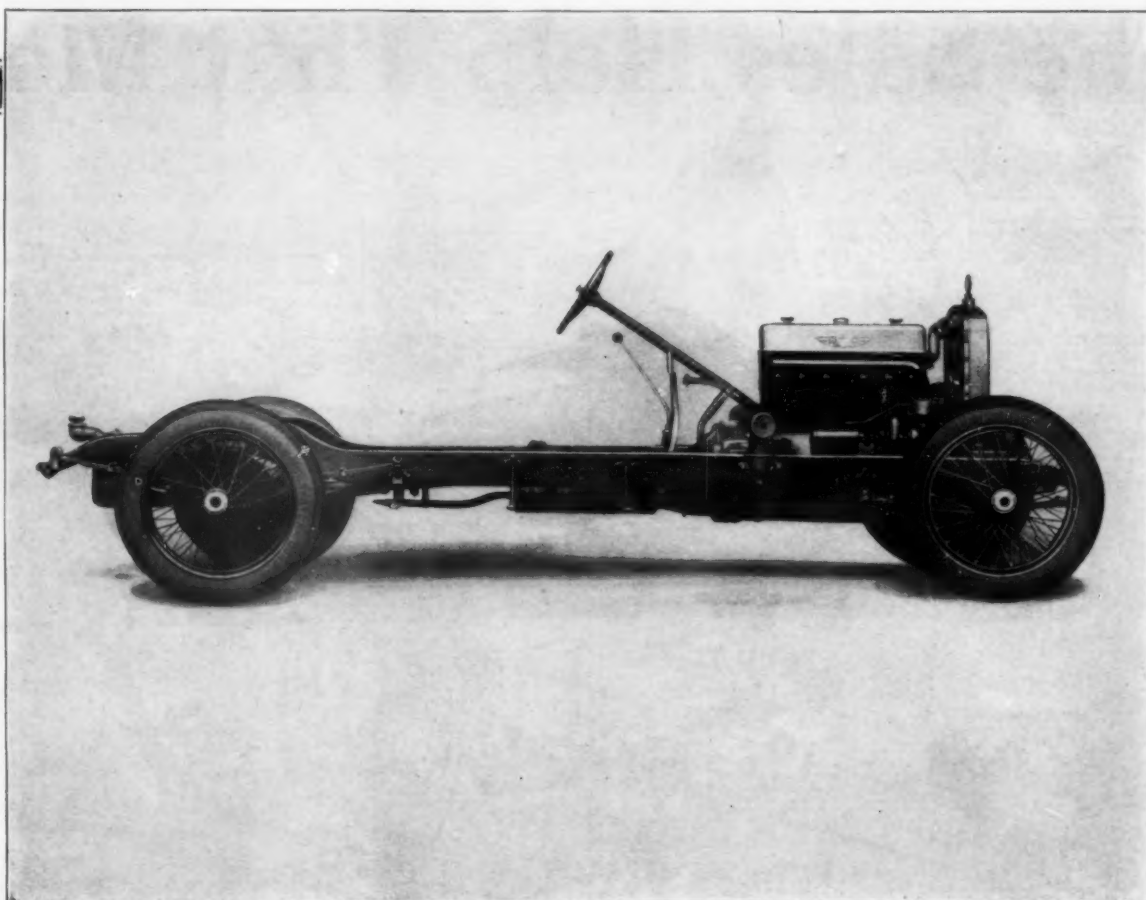
H. C. S. Motor Car Co., Indianapolis

SERIES IV

SIX TOURING, \$2650

FOUR TOURING, \$2250





Chassis of the New Six

A Dealer Asset

This year the H. C. S. Six is the bright spot in the lineup of quality cars. No car ever was designed so well or built so well except the new H. C. S. Four. Series IV, which includes the new Six and the very powerful Four, is the best line of cars Harry C. Stutz ever built.

The H. C. S. dealer franchise is based on the fairest contract that ever was written in the automotive industry. H. C. S. dealers are treated as business partners by the H. C. S. factory.

H. C. S.

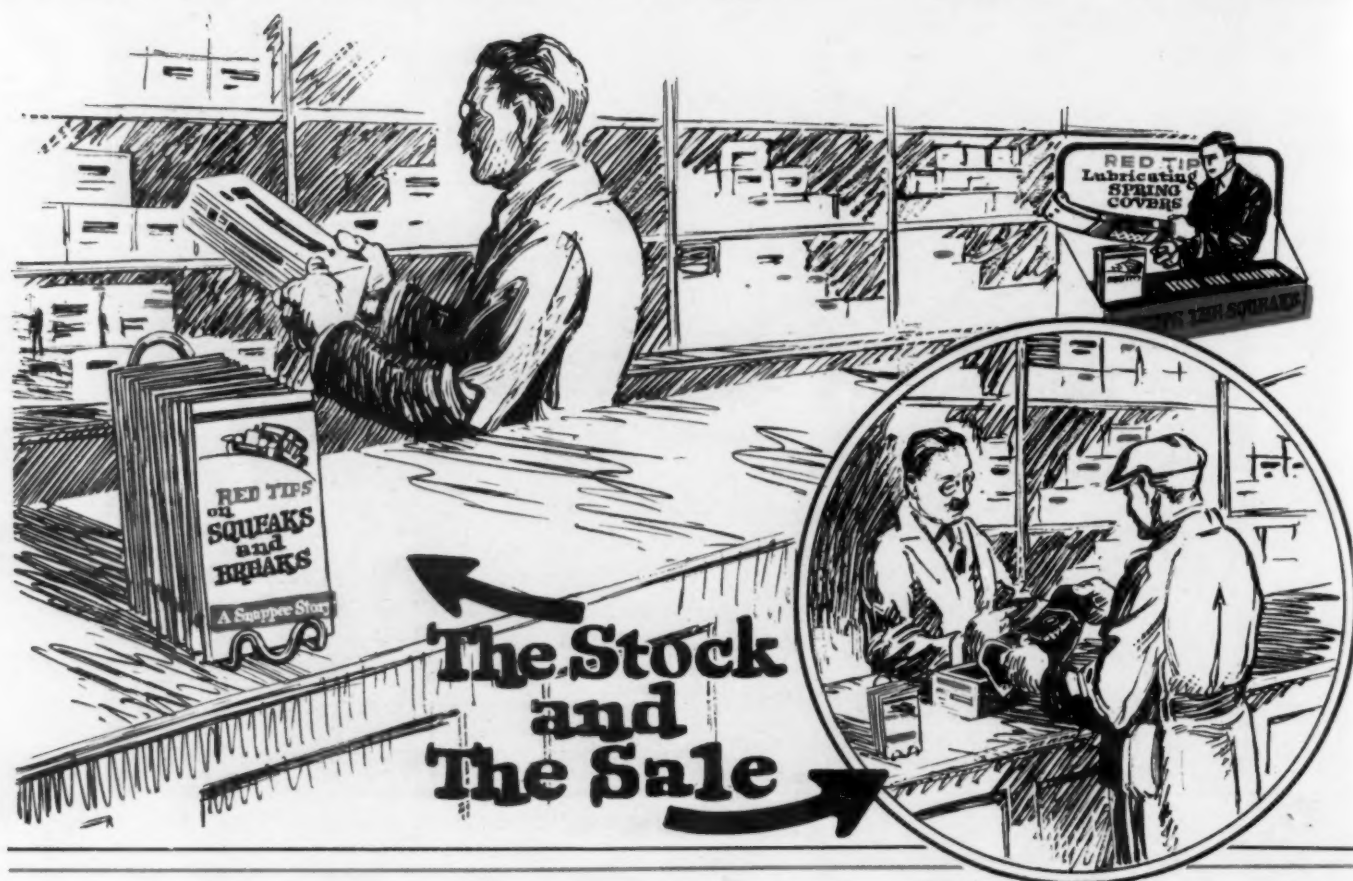
DESIGNED AND BUILT BY HARRY C. STUTZ

H. C. S. Motor Car Co., Indianapolis

FOUR ROADSTER, \$2250 • FOUR BROUGHAM, \$2850 • FOUR COUPE, \$2600



The Sales Help That Moves



Our Direct-to- the-Dealer- Selling Plan—

Gives RED TIP dealers a substantial money - making advantage in the sale of spring covers.

Discounts have been eliminated all along the line, giving them an undeniably greater margin of profit.

There's no profit "sliced" off on the way to RED TIP dealers. They get it all — direct.

ANOTHER THING—

The Direct - to - the - Dealer method of merchandising

permits us to offer a better product, at a lower retail price—giving RED TIP a further sales advantage.

Car owners like RED TIP Covers for the service they give. The car always rides comfortably — and lubrication can be forgotten.

Dealers like to handle RED TIPS because they sell fast — and return worthwhile profits. And the stock can always be gotten direct—on time.

This Fast Selling Necessity

Locate the RED TIP counter card in a good spot—place a supply of "Snappee Stories" near it—stock the shelves with RED TIP Covers and then—**WATCH THEM SELL.**

MOTORISTS are getting wise to the need for spring protection—and are fast putting covers on their springs.

RED TIP Covers, for example, by their constant automatic feeding action, keep the spring leaves freshly lubricated **PERMANENTLY**—always easy working—preserving the original riding qualities of the car.

Whether grease or oil is used as the lubricant, RED TIP is just as effective. For grease or oil cannot leak out—dirt, dust and water cannot work in.

No rust. No squeak. No broken springs.

RED TIP Lubricating Spring Covers are

quickly attached. Not a bolt or nut is disturbed. And, once in place, your springs need no attention for a year or two. When they do, it is merely necessary to force in a fresh supply of lubricant—from any oil can or grease gun.

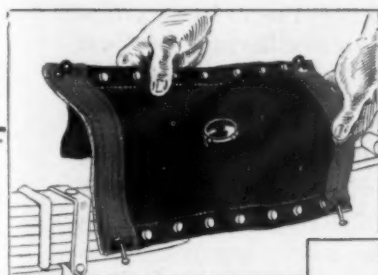
The springs are kept young—and in first class condition.

RED TIP Covers sell on sight: it's their quality—their price. And this is the time of the year car owners will be putting them on.

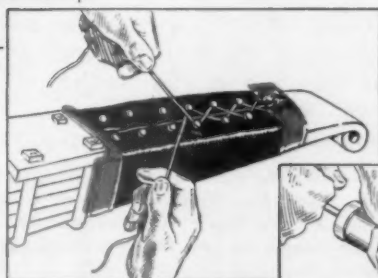
Read our "Snappee Story"—get a supply for your patrons. "Snappee Story" gives some pertinent hints on spring care and lubrication.

Our Direct-To-The-Dealer Selling Plan will interest you—and your cash drawer. Get the details.

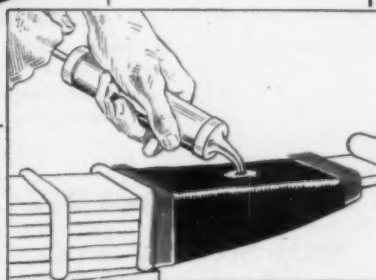
THE SNAPPEE COMPANY
Chelsea, Mass.



WRAP IT AROUND



LACE IT UP



FORCE IN GREASE OR OIL

3 Types

No. 1



Plain Spring Cover

No. 2



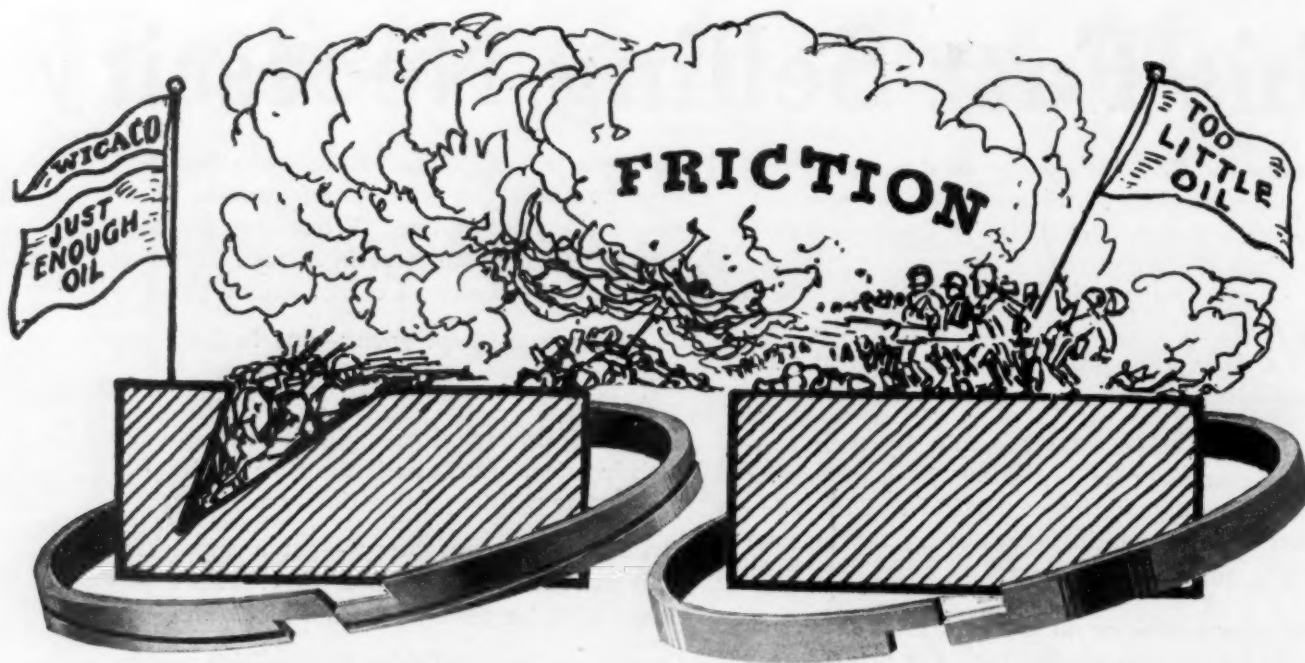
Spring Cover With Grease Gun Connection

No. 3



Spring Cover With Oil Connection

RED TIP
Lubricating Spring Covers



How Should Friction Be Fought? Trench, or Open Warfare?

Jobbers: Dealers:

repair shops and garages have long awaited a piston ring they could honestly guarantee to give increased power, greater mileage, fuel and oil economy, and less friction and wear. To give them live distributing service we have developed a Jobber's Zone Distribution Plan that will prove especially interesting to the jobbers selected for each territory. It will be well worth your while to learn the details.

Piston Efficiency soldiers, struggling on bone dry metal, and deprived of their weapons of oil, soon fall prey to the hot assault of Friction.

But here the assault ends. For the disturbers are stopped decisively by a new line of defense—the Wicaco Wandering Groove trenches.

Safely lodged in the trench-like oil carrying groove of the

Wicaco Ring, the defenders discharge a steady barrage of "just enough oil" and quietly, but firmly, break up the heat formation of the Frictioneers—preventing them from reaching and wearing down Cylinder Wall.

The annihilation of Friction means no more worn crevices that permit an overflow of oil to fatten the other enemy—Greedy Carbon.

Get the complete story of the Wandering Oil Grooves, Twin Cut, Individual Cast, Concentric Shape, One-piece Construction — and other advantages of the Wicaco Piston Ring. Our descriptive data give the details.

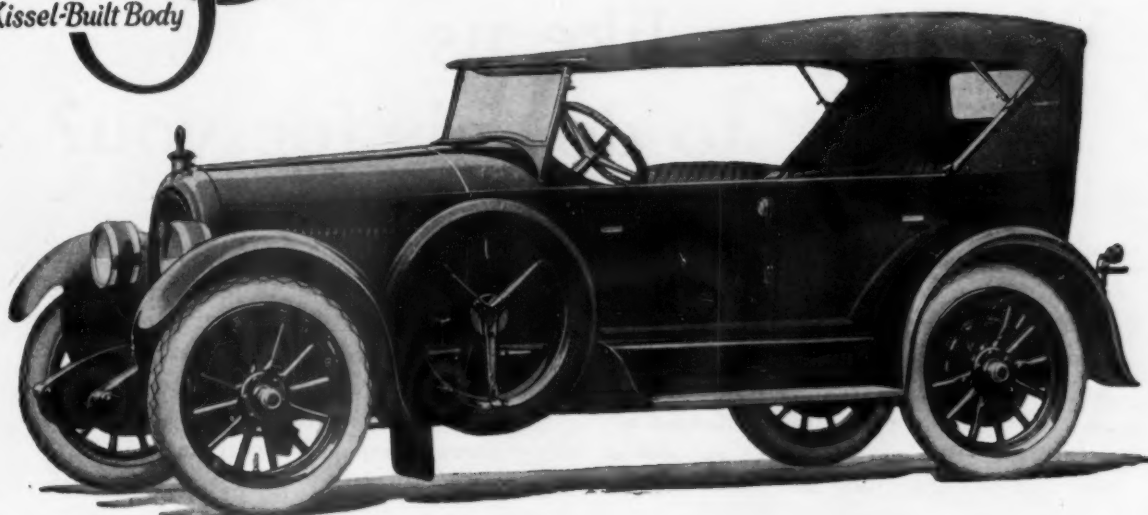
Wicaco Screw & Machine Works, Inc.
4801 Stenton Ave. Philadelphia, Pa.

pronounced
WICK-A-CO



50c
and up

\$1485
with Kissel-Built Body



Custom Built at a Quantity Price

When the model "Fifty-five" Phaeton was announced at \$1485, the Kissel Motor Car Company achieved an end for which it has been striving for seventeen years—to produce a truly custom-built car at a price comparing favorably with that of many cars far less finely made.

To preserve Kissel standards of custom-building has been the least difficult feature of this task—for Kissel designers, engineers and craftsmen know no other standards.

But such a price for such a car could be achieved only by a company of long experience, exceptionally situated as regards manufacturing facilities, and able to produce on a large scale a car that until now has been built only for the few.

The Kissel of 1923 retains all the exclusive features of former models; and is driven by the new Kissel motor, capable of acceleration from 5 to 60 miles an hour in 60 seconds, without the usual vibration.

Judge the car from a demonstration.

Dealers—if your territory is open, write for confidential details that prove the 1923 Kissel is the right car—at a right price for your most profitable market. Let us tell you how Kissel really custom builds his car as if made to each customer's individual order, yet produces in quantities that permit an unusually low price for a car so made. You will then appreciate why the Kissel is a sales creator—and why your big market is a Kissel market. Write or wire today.

Prices F. O. B. Factory.

KISSEL MOTOR CAR COMPANY, Hartford, Wis., U. S. A.

KISSEL

The Custom Built Car



Would you like us to do this for you?

SUPPOSE after investigation and a talk with our representative you decided that you ought to stock Hanes Cords. After you had given our representative the order and were getting ready to shake hands and say "good-bye" — suppose instead of going, that this representative sat down and told you something like this.

"Mr. Smith, you have listened to my story, found out that it had facts to back it up and have decided to take an initial order of Hanes Cords. That's fine! But we want to make sure you come back for more Hanes Cords. Because we do, we are going to run an advertising campaign of 7,800 lines in your local paper and pay for it ourselves to help you sell these Hanes Cords quickly. This campaign is going to

tell your customers the Hanes story and convince them of Hanes quality and service just as you have been convinced. And after that first order of yours has been sold out we are not going to leave the rest up to you. We are going to come back and give you more newspaper advertising and outdoor and direct by mail advertising as well."

After a story like that you'd probably give our representative one of your best cigars or something stronger if you had it on tap. Well, that is just what we will do for you, so if you feel like handing out any compliments, the greatest we could receive would be a letter from you telling us to send that representative around to see you. Is it a go?

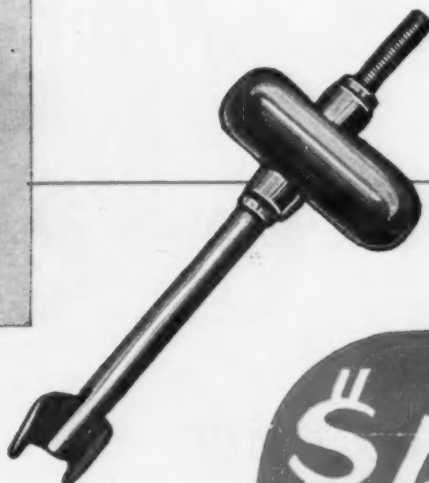
THE HANES RUBBER COMPANY

Winston-Salem, North Carolina

HANES CORD TIRES

The High Water Mark in Tire-making Skill





This Valve Grinder Cuts Time 75% —and produces improved valve seats



This low price means there is no extensive non-productive investment tied up when tool is not in use because your drill can be used for other purposes.

A NEW Valve Grinder—one that gets the job done in a quarter of the time taken by ordinary tools. Yet it costs but \$5. The speed is the reason—2000 r.p.m. as compared with "talk" of 400 to 600.

Vibration? NONE. The KESS weighs but half a pound. Less fatigue for the operator. Can be operated by electric or breast drill.

Another time-saving feature. The Kess easily reaches the hard-to-get-at valves, like the Ford rear cylinder valves. Nothing can stop it—it gets on a valve-head and you have a new

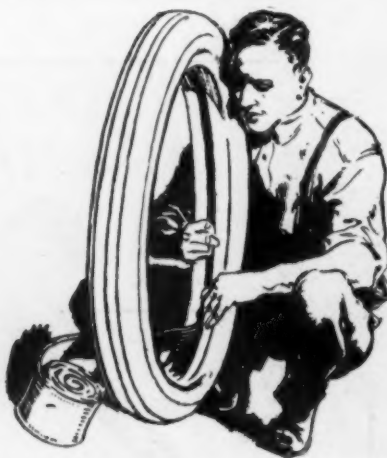
seat in a few moments. Built like a precision product of the tool-room. Will last for years.

Valve-grinding is one of the most common jobs you do—equip yourself with a Kess Grinder and get all the money there is in the operation. And do the kind of job you are proud of.

JOBBER, DEALER: There's something for the trade in this. There is no question of selling the Kess. Sells itself—on sight. We don't like to rush you, but the time to get into touch with us is NOW.

KESS High Speed VALVE GRINDER

The Kess Manufacturing Co., 809 Harrison Bldg., Philadelphia



His customers always come back!

JONES is not an unusual salesman. He carries the same brand of tubes as his competitor across the street. Yet **HIS** customers are always satisfied—they always come back! While those of the fellow across the street sometimes do, but more often they **DON'T**!

"Darn good tube, that," Jones' customer says, laying a worn tube on the counter. "Can you give me another like it—it's given me greater mileage than any I've ever bought."

"Yes, sir, it is a good tube," says Jones. "But that's not the whole story. Remember when I sold you that tube, I also sold you a flap which I said would prevent pinching and wearing the tube. I told you that you would get at least one-third more tube mileage. It was the Double-D Tire Flap that made that tube last longer. It's part of my job to see that you get the most out of your tubes. That's why we always urge customers to use Double-D Flaps!"

Your business, like Jones', can be built only by making satisfied, life-long customers. For satisfied customers mean a steadily growing, healthy trade—a business that makes real money. Everywhere dealers are using Double-D Flaps to build customer satisfaction. You can do the same.

The quality tire flap

Double-D Tire Flaps are standing up under the severe tests they are put to daily on the cars of thousands of motorists. In fact, they have given such road satisfaction that they are acknowledged to be the best flap on the market. They are made in the largest flap-making plant in the world, where every care is taken in their manufacture.

Our national advertising, convincing booklets, and attractive window and counter displays will help you sell.

If you do not carry Double-D Tire Flaps, but would like to get your share of this ever-increasing business, fill out the coupon below and mail to us. This will bring you full details. Don't delay—get the facts right now!

DEXTER RUBBER MANUFACTURING CO.
Goshen, New York

DOUBLE-D

TIRE  FLAPS

Increase tire mileage



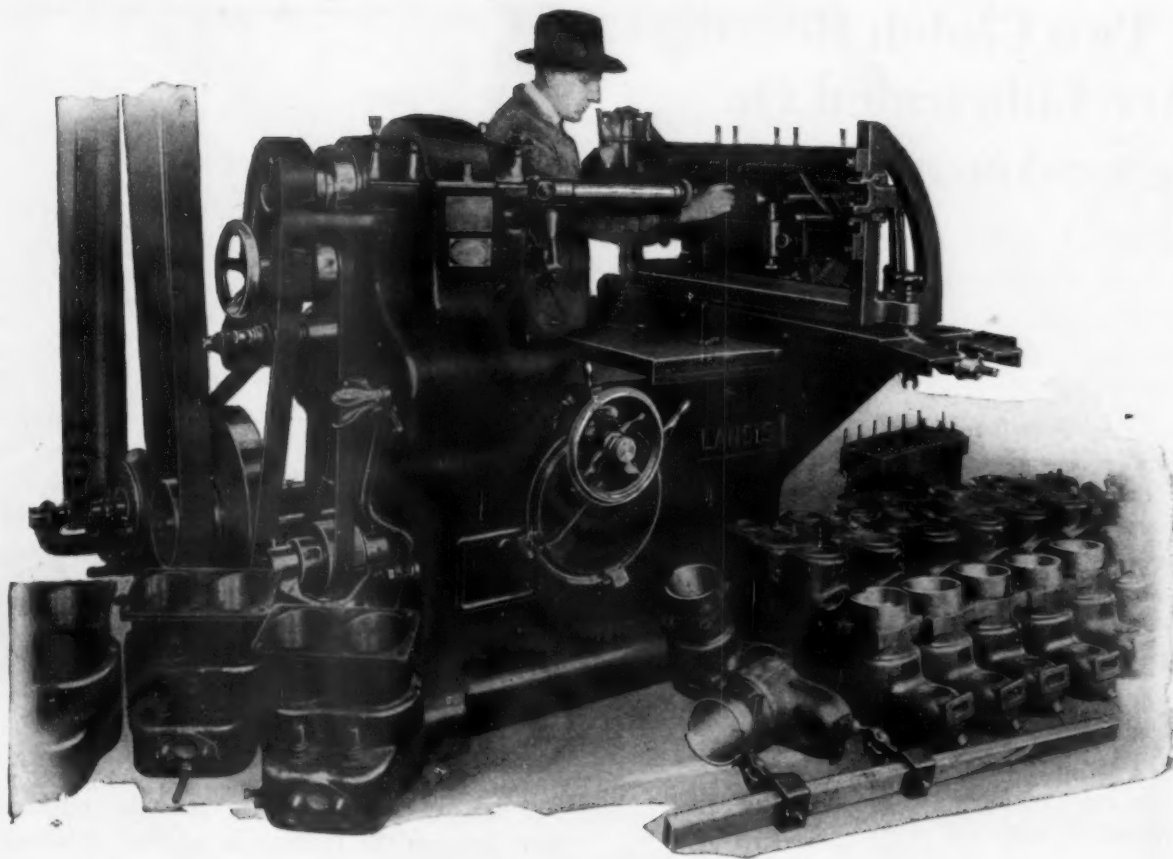
Quick selling
display carton

Dexter Rubber Manufacturing Company,
Goshen, New York

Please send me your price list and
sample of Dexter Tire Flap.

Name.....

Address.....



It's ALL here— in this one machine!

| | |
|---|----------------|
| Maximum diameter machine will grind | 10" |
| Maximum diameter hole machine will grind—regular equipment | 5 5/8" |
| Minimum diameter hole machine will grind — regular equipment | 2 1/2" |
| Maximum depth machine will grind with regular spindle | 15" |
| Off center movement of wheel spindle | 1 1/16" |
| Feed of wheel spindle, per revolution of outer eccentric sleeve | .0005 to .0015 |
| Rotary speed of outer eccentric sleeve R.P.M. 40 and 82 | |
| Speed of grinding wheel spindle.....R.P.M. 5415 and 7075 | |
| Maximum traverse of work carriage | 3 1/2" |

Landis—one of the largest builders of grinding machines—gives you everything necessary or desirable in a cylinder grinding machine.

QUICK CHANGE FROM ONE JOB TO ANOTHER. The Landis Centering Bar and the Landis Centering Fixture make changing from one bloc to another a matter of a few minutes.

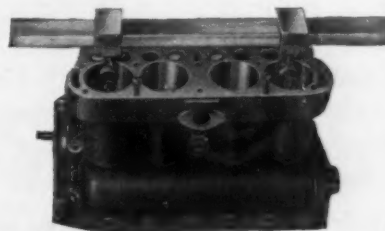
TIME-TRIED CONSTRUCTION. Every Landis detail of construction is the result of our long experience—the machine comes to you PERFECTED, ready to make good under any reasonable operation condition.

We suggest, first, the Landis Catalog—then a Landis quotation. No obligation, of course.

LANDIS TOOL CO.

Waynesboro, Pa.

New York Office
51 Chambers Street



The centering bar is adjusted to the cylinder bloc before it is placed in the machine.

LANDIS

How Two Clutch Bearings Are Lubricated On Pierce-Arrow Trucks

Providing Clutch-release Insurance by Perfecting Accessibility

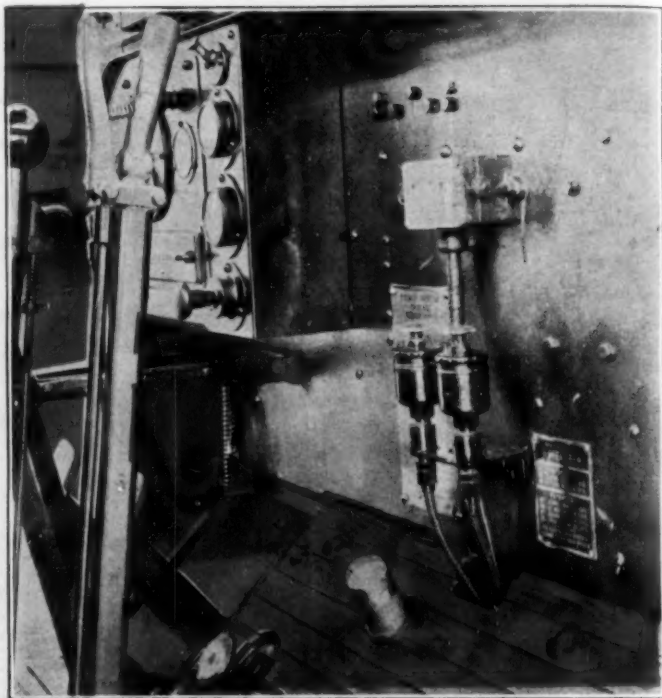
Practically all manufacturers warn against "riding the clutch," but the warning is bound to be disregarded more or less frequently.

To provide maximum insurance against the effects of "clutch-riding," it is generally accepted that the lubrication of clutch bearings should be made as convenient as possible.

The illustration at the top of this page shows how superior accessibility and convenience are achieved on Pierce-Arrow trucks by using two Oil-Kipps.

With them the clutch release bearing and the clutch shaft rear bearing can be lubricated in a few seconds by the driver.

In this way the tendency to neglect lubrication—because of the inconvenience of taking up floor-boards—is minimized to such an extent that frequent and



Oil-Kipps are standard equipment on Pierce-Arrow trucks for lubricating clutch release and clutch shaft rear bearings

The instroke of the plunger puts this oil under pressure, because the plunger is so small in diameter that each pound of pressure exerted on the handle means a great many pounds in the pump.

How Pierce-Arrow Dealers Use Oil-Kipps

Because of the advantages of ample oil lubrication for the steering gear a number of manufacturers are using them to make steering easy.

Others are also using them on the shackle bolts to do away with squeaks, rattles, and untimely wear.

To a number of Pierce-Arrow dealers, Oil-Kipps make a very strong appeal as a means of lubricating certain shackle positions and the steering knuckles.

Some have already obtained a stock for this purpose from their distributors.

With these dealers, Oil-Kipps are especially popular for steering knuckle positions. A set can be installed in less than twenty minutes.

We can make direct shipments to any Pierce-Arrow dealer. When ordering, give us the name of your distributor.



Cutaway view of vertical Oil-Kipp showing barrel, piston, and valve.

ample lubrication, with heavy oil, becomes a practical certainty.

How Oil-Kipps Work

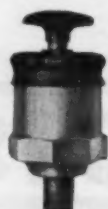
Each Oil-Kipp consists of a complete pumping unit contained in a die-cast aluminum cup carrying several months' supply of heavy oil. No gun or auxiliary pressure booster is necessary.

Oil-Kipps are operated by merely pumping the spring plungers or pistons.

Their success in forcing heavy oil around tight fitting bearings is due to a simple hydraulic principle.

The outstroke of the plunger creates a vacuum in the barrel, so that the oil is sucked into it from the cup.

MADISON-KIPP CORP., MADISON, WIS.
Nolan Smith & Co., Sydney, Australia. Wm. Coulthard & Co., Ltd., Carlisle, England



Oil-Kipps

MAKE STEERING EASY



NINE out of ten spring breakages are at the center. At the danger point Titanic Springs are strongest, so strong they are guaranteed forever against center breakage! The Titanic "hump" construction embodies the principle of the arch and eliminates weakening center bolts and nibs.

It is easy to sell Titanic Springs. Our Display Rack, Signs and Advertising Literature tell customers you carry Titanics—and their big selling point eliminates all argument. See Chilton's or write to us direct for name of your nearest distributor and complete price information.



*\$50.00
worth of road
signs and other
sales helps
Free*

*Ask us or your
nearest distributor
— see Chilton's*

TITANIC

Trade Mark Reg.



SPRINGS



TIME is the repair shop's chief commodity of trade—and it is the one item that car owners are learning to check up when paying for service.

Lack of proper testing instruments for quickly locating troubles is a frequent cause of excessive repair bills—and dissatisfied customers.



Good Shop Equipment



Cuts Labor Costs and Attracts Trade

**How long will it take?
How much will it cost?**

Those are the two questions uppermost in the owner's mind when he brings his car in for service.

The condition of your shop will dictate the answer. Will he see a well ordered array of equipment that proclaims your ability to do high grade work quickly and at low cost? Will your shop *invite* his patronage? Or will he see men trying to make machines of themselves — wasting time, running up heavy charges, doing indifferent work — all for lack of equipment?

By these tokens—by what he *sees*—he judges you.

THE quickest way to invite business failure is for the shop owner to pass the cost of wasted time along to the customer.

And he is charging for wasted time when he charges for work that could have been done more quickly with proper equipment. The only person who is fooled by the transaction is the shop man himself. The car owner has possession of his own pocketbook, and comparisons of repair bills tell a big story. And not only that; the difference between adequate and inade-

quate equipment is generally very clearly indicated in the quality of the work done.

Sooner or later the car owners in a community discover the well equipped shop, and take their business there. The shop that can do good work in quick time and at fair prices will not only get the most business, but will make the most profit per job. For good equipment does cut labor costs, it does keep down the size of repair bills, and it does attract customers.

Names Every Shop Man Should Know

ANY of the manufacturers listed below will help you in the selection of equipment best suited to conditions in your shop without obligating you in any way.

Weidenhoff Products 4352-58 W. Roosevelt Road. Chicago, Ill.

Electrical Testing Devices
Test Benches
Battery Dischargers
Growlers
Magnetizers
Variable Speed Motors
Generator Holding Vises and
Driving Chucks
Mica Undercutters

Continental Auto Parts Co. Columbus, Ind.

Motor Overhauling, Radiator
and Axle Stands
Piston Vises, Gear Pullers
Creepers
Wrecking Trucks
Straightening Presses
Piston Aligning Devices
Burning-in Machines

Wright Mfg. Co. Lisbon, Ohio

Wright High-Speed Chain
Hoists
Standard Screw Chain Hoists
Differential Chain Hoists
Steel Trolleys for Overhead
Track Systems
Hand Traveling Cranes

The Manley Mfg. Co. York, Pa.

Cranes—Wrecking and Floor
Presses—Garage and Arbor
Auto Hoists, Garage Lights
Garage and Service Jacks
Towing Trucks
Engine and Axle Stands
Portable Benches
Portable Tool Trays
Air and Water Stations
Truck Wheel Handler
Chassis Underworker

Oxweld Acetylene Co. Newark, Chicago, San Francisco

Oxy-Acetylene Apparatus and
Supplies
Ever-Ready Welding, Cutting
and Lead-Burning Outfits

Weaver Mfg. Co. Springfield, Ill.

Auto Hoists, Axle Stands
Arbor Presses, Jacks
Ambulances
Tire Changers
Tire Spreaders
Wire Wheel Repair Stands
Bucket Pumps
Gasoline Cans

Mid-West Mfg. Co. Minneapolis, Minn.

Red Devil Dolly Jacks
Tire Changing Jacks
Adjustable Garage Horses
Garage Cranes and Ambulances
Burnishing Machines and
Burnishing Compounds

T. R. Almond Mfg. Co. Ashburnham, Mass.

Drill Chucks
Lathe Chucks
Micrometers, Outside
Micrometers, Inside, for Cyl-
inder Measurements

Kellogg Mfg. Co. Rochester, N. Y.

Kellogg Electric Motor Driven
Garage Compressors
Kellogg Air Towers
Kellogg Valves
Kellogg Gauges

Bonney Forge & Tool Works Allentown, Pa.

Original Chrome-Vanadium
Drop Forged Wrenches
Original Chrome-Vanadium
Valve Tappet Wrenches
Carbon Steel Drop Forged
Wrenches of all kinds
Stillson Pipe Wrenches
Adjustable Wrenches
Combination Wrenches
Garage and Small Vises
Battery and Grease Cup Pliers
Body Iron Assortments
Special Automobile Tools
Drop Forgings

The Black & Decker Mfg. Co. Baltimore, Md.

Portable Electric Drills
Electric Air Compressors
Electric Portable and Bench
Grinders
Electric Valve Grinders
Bench Drill Stands

Frank Mossberg Co. Lamb St. Attleboro, Mass. *Wrenchsmiths for 20 Years*

Solid Socket Wrenches
"Tee" Handles
Speeders, "Swivel Joint"
"Tee" Handles and Speeders
Special Wrenches and Tools
for Fords
Miscellaneous Automobile
Tools
Socket Wrench Sets and
Accessories
Engineers' Wrenches
Adjustable Wrenches
Metal Stampings

"Good Equipment Plus Knowledge Gives the Big- gest Pay."—Ambu.

Instruction in Automotive
Electricity

Educational Division The American Bureau of Engineering Chicago, Ill.

Manufacturers of
Battery Shop Equipment

The Jacobs Mfg. Co. Hartford, Conn.

Drill Chucks

Stevens & Company 375 Broadway New York

Stevens "SPEED-UP" Tools

Piston Aligner
Microgauge
Piston Vise
Valve Reseaters and Refacers
90 Special Tools for Ford
and Fordson
Sectional Cabinets

The Burton-Rogers Co. 755 Boylston Street Boston, Mass.

Hoyt Electrical Instruments
Ammeters
Volt Meters
Rotary Meters
Growler Sets
Magneto Testers
Cadmium Meters
Cell Meters
Mohawk Rectifiers

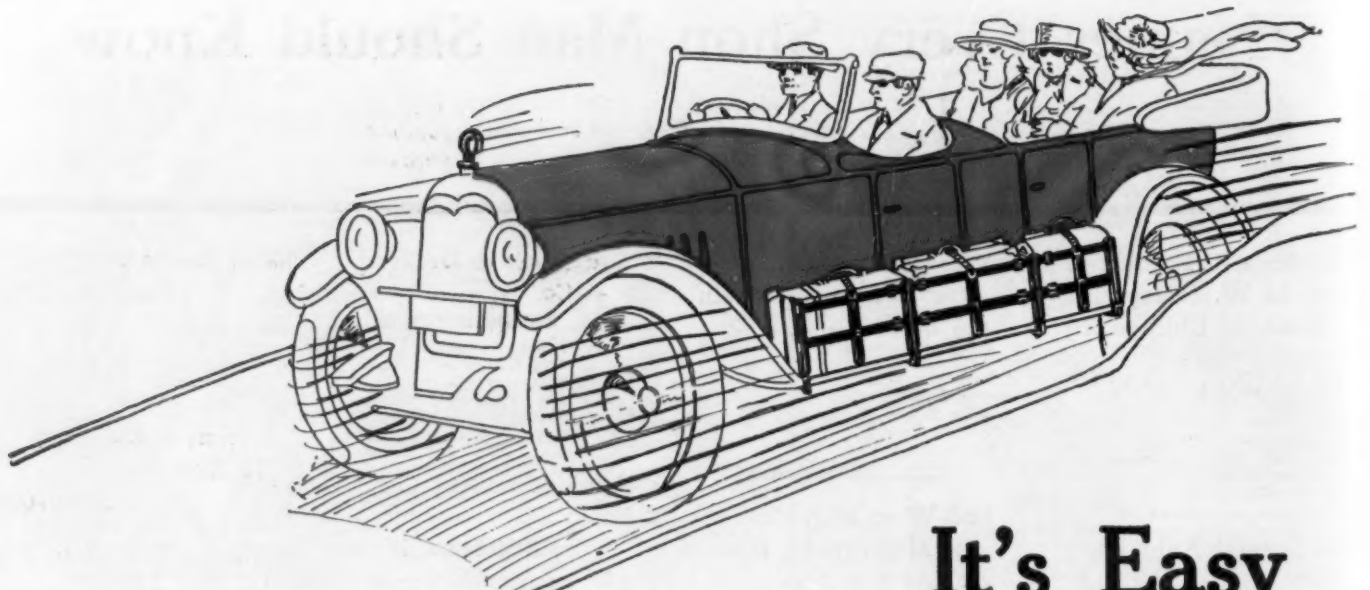
This advertisement is published and paid for by the concerns listed above who are pioneers in the development of time and labor-saving equipment for automotive service work.

These concerns are co-operating with all automotive service men, and you are cordially invited to write to any of them for information and advice regarding the class of equipment shown below their names.

SERVICE EQUIPMENT ASSOCIATES



*"The Best-Equipped Shop
Gets the Business"*



It's Easy to Identify the Marquette

THE convenience and utility of the Marquette Luggage Carrier is instantly apparent. That is why it is so popular with discriminating car owners.

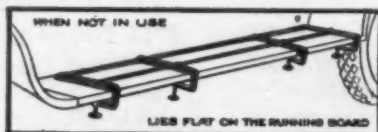
Enhances Appearance of Car. Its lines harmonize with the lines of the finest automobiles.

Prevents Marring of Finish. Luggage is strapped to Carrier and held absolutely stationary. The strong web straps are held securely to carrier by an ingenious steel clamp. Straps are 60 inches long.

Folds Down Flat, on running board, when not in use. No need of taking it off or adjusting it. Simply raise it and it is ready for use.

Built for Service. The Marquette Luggage Carrier is built of special high-grade steel. The uprights are channel-shaped to give them tremendous strength. Finished in black enamel. 2 sizes—4 ft. and 5 ft. when extended.

Adjustable in length. Fits any running board. Quickly attached without tools.



For Safety, Capacity and Convenience in luggage carriers insist upon the "Marquette."

**Sold by Live Jobbers
and Dealers**

Dealers: Ask your jobber about his attractive proposition on the Marquette.

MARQUETTE MFG. COMPANY

St. Paul, Minn.

MARQUETTE

LUGGAGE CARRIER

A "Bang up" Timer Proposition

Write for Details



THE "BINGO" All-Metal Track

The "all-metal track" and contact points are of brass, imbedded in the molded Bakelite distributing head and extending 1/16-inch beyond its surface. The "raised-track" construction insures long life.

The air-gaps that separate the "all-metal track" from the contact points are something NEW in timer construction. Their purpose is to allow the brush a clean "make and break"—the same method used on armatures for years.



"BINGO" BRUSH and CASTING

The brush is of a graphite and copper composition—and therefore self-lubricating. The rotor is die-cast which insures accurate timing.

"BINGO" DISTRIBUTING HEAD

—of molded Bakelite and therefore waterproof—also fool-proof against "grounds" and "short-circuits".

"BINGO" TIME HOUSING

The ring holding the distributing head in position is of solid brass, nickel-plated.

Your INITIAL ORDER AT MANUFACTURING COST—that's our proposition to you, Mr. Dealer. We need YOU—your selling talks to your customers—to put the "BINGO" over in a big way.

That's why we are offering you this extraordinary opportunity—we want to pay you well in RICH PROFITS for your time and trouble.

Our display cards and other dealer helps will assist you—bring customers into your store to buy.

Once sold the "BINGO" stays sold and repeat orders will come. For the "BINGO" is an accurate timer—waterproof, fool-proof and unqualifiedly guaranteed.

On a recent blocktest, the "BINGO" timer was run 3500 miles continuously. The micrometer showed practically no wear on the track and only 3-1000 of an inch on the brush. Give your customers such a timer and they'll come back for more.

Fill out the Coupon TODAY. Make a REAL PROFIT on your timer sales.

The Wm. Deddens Manufacturing Co.

35 East Front Street, Cincinnati, Ohio

TIMER
BINGO
FIRES EVERY TIME

THE WM. DEDDENS MFG. CO.
35 E. Front St., Cincinnati, O.
Gentlemen: Send me details of your "detailed
profit" propositions on BINGO Timers.
Name _____
Address _____
City _____
State _____

Kokomo Crusader Cord



The Complete Kokomo Line

The dealer who does not handle a complete line on the tire he sells is losing business every day in the year. One of the biggest assets that Kokomo dealers have, next to the splendid quality of the tire itself, is the fact that that Kokomo line is complete—a full line of sizes in both cords and fabrics.

*In this Kokomo Tire
is mileage plainly evi-
dent and fairly priced*

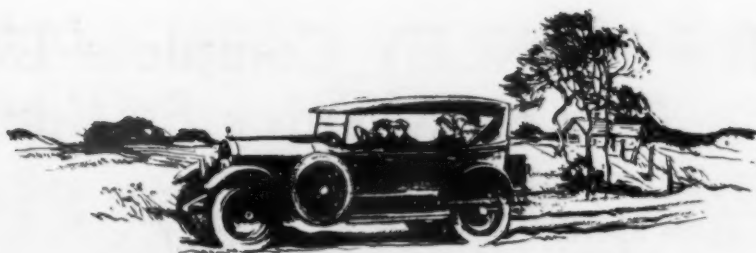
Examine carefully the Kokomo Crusader Cord. Note the sturdy construction—the heavy side wall, the thick, firm tread, the central rib that carries the weight of the car in straight going, and the gripping studs that hold the road on turns or slippery surfaces.

And the Kokomo Crusader Cord is not only a GOOD tire, it is an unusually handsome tire.

Kokomo dealers have found the Crusader a means to a greater cord business. If you would like to join this rapidly growing army of prosperous and satisfied merchandisers a post card will bring you full information.

KOKOMO RUBBER CO., KOKOMO, INDIANA

LONG ~ LIFE
Kokomo
TIRES AND TUBES



Built for Comfort and
Peace-of-Mind

Grow With the Stutz

Sales of the Stutz Six have grown to such unexpected proportions that an increase in the original production program of more than 300% has been necessitated.

Demand for Stutz Speedway Four models since January 1, 1923 has been greater than for any similar period in the history of the company.

Production of Stutz cars for January of this year showed an increase of 310% while the increase for February indicated a gain of 351% over the same two months a year ago. March sales break all previous records.

The Stutz dealer organization has been augmented more than 150% since the New York Automobile show.

Within the last 60 days 19 leading merchants in as many important centers have replaced other well-known lines of cars with the Stutz while 6 former Stutz distributors in larger communities have determined to handle the Stutz on an exclusive basis.

Every distributor and dealer owes it to himself to learn what has occasioned this startling progress in Stutz distribution and selling.

It will give him the real clue to why so many representative automobile merchants are so eager to acquire the Stutz franchise—to place themselves without delay in a position to grow with the Stutz. It is impossible to be better fortified by product, franchise and factory than through a Stutz connection, in meeting present conditions or in safeguarding and assuring future success.

A letter or wire will bring full particulars. Get in touch with us today.

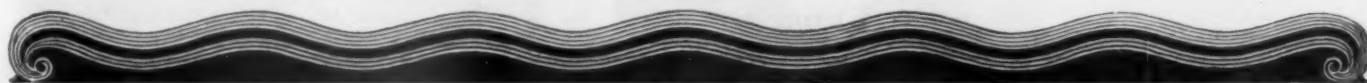
N. B. Remember that the Stutz Six is America's lowest priced quality Six—Touring Car and Roadster, \$1995; 5-passenger Sedan, \$2550. Stutz Speedway Four models—America's pre-eminent sport cars—are priced as follows: Touring Car, \$2640; Roadster, \$2450; Coupe, \$3490; Bearcat, \$2790; Bulldog, \$3115. All prices exclusive of tax and freight.

STUTZ

STUTZ MOTOR CAR COMPANY of AMERICA, Inc.

Builders of the Original and Genuine Stutz Motor Cars

Indianapolis. Indiana, U. S. A.





The MANLEY Complete Line of Air and Water Stations

**A Type for Every Need—
at the RIGHT Price**

The Manley line of air and water stations are remarkably low in price. Further, they are equal in life and utility to the most elaborately constructed and expensive stations.

Each type of station is equipped with 25 feet of hose — long enough to serve two cars at the curb without moving either car.

Six feet of water hose with self-closing faucet are now supplied with the outside Services.

Each outfit is tall enough to clear the top of any car.

Each station does everything *any* station can do —and does it at *less cost*.

An Electric Sign in place of the metal sign can be supplied at slight additional cost.

Send for Catalog of Manley Air and Water Stations, and other items of Garage Equipment from Piston Vises to 5-Ton Wrecking Cranes and 50-Ton Presses. Ask your Jobber also, he sells it.

MANLEY MFG. CO.
York, Pa.

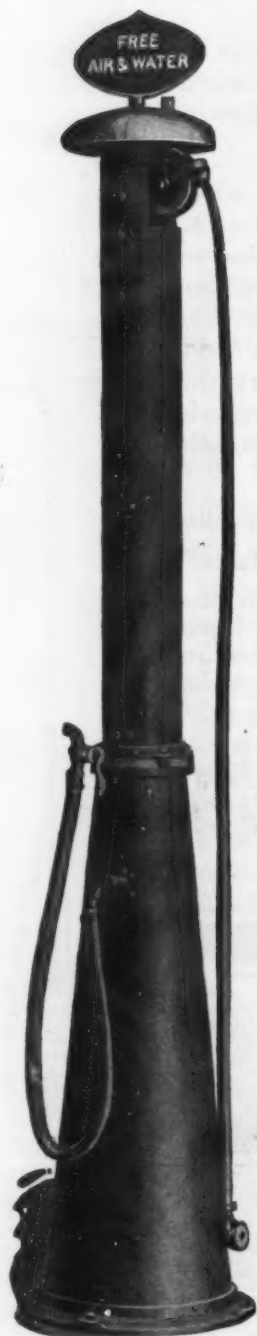
Any Shop with

Manley

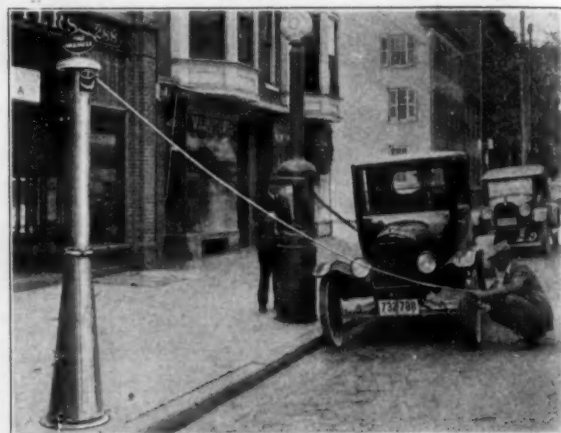
Garage Equipment

MADE IN YORK PA.

is the Best Equipped Shop. It Gets the Business

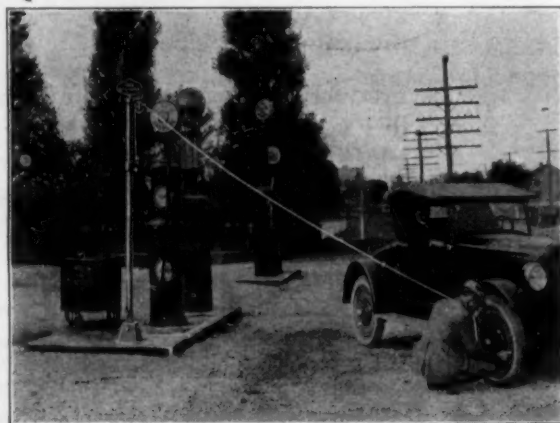


No. 750
\$48.50



The De Luxe Type \$48.50

Attractive! This handsome outfit has all the beauty of appearance and dependability of operation found in the most expensive stations. Its appearance will harmonize wherever gas stations are used.



Outside Curb Type—\$36.50

A practical outside curb outfit that handles both air and water. Has all the utility and will last as long as far more expensive outfits.

Gravity Operated Only

There are no springs, no stuffing boxes, no swinging joints, no twisting of the hose in the Manley Stations. A weight pulls the hose back, that's all. The top pulley swivels as the hose is pulled sidewise and the large Base makes it easy to connect up to the Air and Water lines.

The Inside Type—
\$19.50

A handy inside Air Station that overcomes the nuisance of having a long coil of hose lying around the shop or garage. Attached to the wall or a post, it is never in the way, yet it is always convenient and ready to use.



No. 752

Do you know you can sell other dealers with a McQuay-Norris Service Stock?



A Service Stock of McQuay-Norris Piston Rings, Pistons and Pins enables you to sell other dealers as well as car owners. This means a big increase in your sales and profits.

With a McQuay-Norris Service Stock you can become local headquarters for the replacement of piston rings, pistons and pins—handling the best known and most widely advertised line on the market.

Years of success are behind these products. No other line of automotive parts can attract as much trade to your shop. Ask your jobber's salesman about a McQuay-Norris Service Stock the next time he calls—or, better still, write our Dept. M today and get all the details.

McQuay-Norris Manufacturing Co.

General Offices, St. Louis, U. S. A.

Connersville, Ind.

Toronto, Canada

McQUAY-NORRIS PISTON RINGS PISTONS PINS

FOR AUTOMOBILES - MOTOR TRUCKS - TRACTORS - STATIONARY GAS, OIL AND STEAM ENGINES - MOTOR BOATS
MOTOR CYCLES - AIRPLANES - COMPRESSORS - PUMPS - LOCOMOTIVES - STEAMSHIPS - REFRIGERATING MACHINES.

McQuay-Norris Wainwright Pistons and Pins

—gray iron pistons as light in weight as safety permits—specially designed for replacements—available in standard sizes and over-sizes—also in semi-finished form 75-thousandths over-size. Pins of exceptional accuracy. Made of special heat-treated steel.

Pistons and Pins
of quality

LEAN-PROOF—its exclusive two-piece design means equal cylinder-wall pressure at all points. Its greater flexibility means better performance in worn cylinders. Best for all grooves except top, which should have **Supercyl**. Made of Electric Iron. Each ring packed in a parchment container. Price per ring—

Supercyl—stops oil trouble. Keeps lubricating oil out of combustion chamber. Collects excess oil on each down stroke of piston and empties on each up stroke, which ordinary grooved rings cannot do. Made of Electric Iron. Each ring packed in a parchment container. Price per ring—

JEFFY-GRIP—the quick-seating ring with the non-butting joint. "Seats in a Jiffy." Can be fitted closer than the ordinary step-cut rings. Ends cannot butt when fitted tightly as quick-seating rings should be. Accurately made of Electric Iron. Each ring packed in glassine envelope. Price per ring—

Snap Rings—of the highest grade. Raised above the average by McQuay-Norris manufacturing methods. Made of Electric Iron. Their use insures all the satisfaction possible for you to get from a plain snap ring. Packed twelve to the carton and rolled in waxed paper. Price per ring—

\$1.25

In Canada, \$1.50

\$1.00

In Canada, \$1.25

50c

In Canada, 50c

25c

In Canada, 30c



"PICK-UP"

*Is As Important
As Good Brakes*



Only \$1⁵⁰
Complete

The instant "spurt" often takes you out of danger when it's too late to use the brakes. At such an important moment it is most desirable to have both hands on the wheel. Without a foot accelerator it is almost impossible to get a quick pick-up, even if you remove one hand from the steering wheel to the throttle.

The Bull Dog Foot Accelerator gives an instantaneous rush of power just when you want it, allows the driver to ease over bumps in the road, around curves and quickly pick-up speed again.

These are features of conveni-

ence and safety in the "Bull Dog" that the Ford owner quickly feels are needed—hundreds of thousands in use plainly indicate the trend of opinion when it comes to buying a foot accelerator. The price \$1.50 complete holds no sales resistance—the quality is indisputable—Rubber covered pedal for appearance; mat binder to keep floor mat from raveling; non-slip foot rest for steady operation.

Fits any type of Ford—any type of carburetor. Easily installed. No special sizes. Quick sure profits for dealers.

Manufactured by

The W. H. THOMAS MFG. CO.

404 W. Sixth St.
Spencer, Iowa

Sales Representatives

The Fulton Company Milwaukee, Wisconsin

"Bull Dog"

FOOT ACCELERATOR *for* FORDS



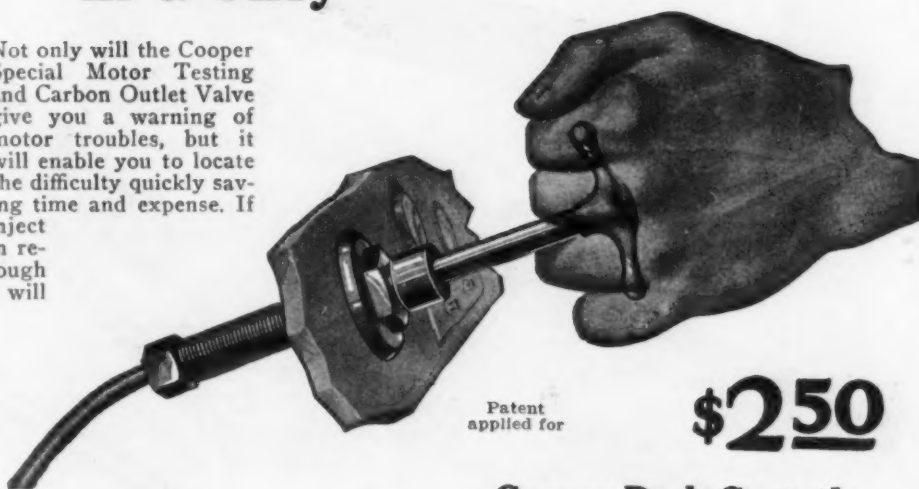
Listen In



Locate Motor Troubles in a Jiffy

Not only will the Cooper Special Motor Testing and Carbon Outlet Valve give you a warning of motor troubles, but it will enable you to locate the difficulty quickly saving time and expense. If

your motor is fouled with carbon, inject a little alcohol or commercial carbon remover and blow the carbon out through the "Cooper." Then the "Cooper" will keep it clean.



Patent applied for

\$250

The Cooper SPECIAL Motor Testing and Carbon Outlet Valve

The back pressure caused by the muffler and by carbon clogging the muffler is relieved by the Cooper Special Valve. It gives a free exit for the exhaust gases which carry with them carbon and soot. Extra heavy spring and rod axle are used so the flapper will not chatter. It is not affected by heat, mud or rust, simple, durable and easily attached. Not necessary to cut exhaust pipe in two, the Cooper fits around. A size for every car. Standard equipment on Paige Daytona Model and other fine cars.



Patented
2-27-23
No. 516028

Cooper Dash Control

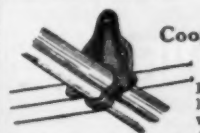
It is right where you want it—at your finger tips and always in sight. No interference with levers, pedals or floor board. Men who service batteries like this feature. Controls Testing Valves, Exhaust heater valves, air chokes, radiator shutters, etc. Designed to fit the hand perfectly and a twist of the wrist locks it in any position. Installed by cutting half-inch hole in dash. Strongly made of brass and steel, nicked and polished. Price \$2.50.

Prices

Valve Only

| | |
|--|--------|
| 1 1/4 in. | \$2.50 |
| 1 3/8, 1 1/2, 1 3/4 | 3.00 |
| 2, 2 1/8 | 3.50 |
| 2 1/4, 2 3/8, 2 1/2, 2 5/8 | 4.00 |
| 2 3/4, 2 7/8, 3 | 5.00 |
| Cooper Special Valve complete with pedal for Fords | 3.00 |

When Cooper Special Testing and Outlet Valves are ordered complete with Dash Control, add \$2.50 to above prices. Add 10 per cent to these prices on Pacific Coast. Ask your Dealer. Dealers ask Jobbers.



Cooper Steering Column Support for Fords

Holds steering column absolutely rigid. Takes out all vibration from steering wheel. Adds greatly to comfort of driving, especially over rough roads. A strong casting, black finish. Fits all Fords having instrument boards, both open and closed models. Packed in individual cartons. Price 75c.

Manufactured by

Cooper Mfg. Co.
Dept. 15-C Marshalltown, Iowa
The Fulton Co.

Sales Representatives
75th and National Aves., Milwaukee, Wis.



EVERY Empire bolt, nut and rivet is perfect in material, in dimension and in finish.

The numerous different lines made by Russell, Burdsall & Ward possess alike an absolute uniformity of quality and accuracy.

RUSSELL, BURDSALL & WARD
◎ BOLT & NUT COMPANY ◎

PORT CHESTER, N.Y.

FOXBOROUGH, CONN. • CHICAGO • SAN FRANCISCO • ROCK FALLS, ILL.

Makers of Bolts, Nuts and Rivets Since 1845

EMPIRE BOLTS



"I sent in a Coupon just like this and got the free sample of PEP WATER-MIXED GRINDING COMPOUND that doubled my speed in valve grinding and let me turn out a better job.

"Before I sent in the coupon I knew there was no grease in PEP. It seems now as if I ought to have known just from that how MUCH better than the old grease mixed compounds PEP would be.

"But I never guessed the half of it till I used the sample that coupon brought.

"Take a tip from my experience and send the coupon NOW, before you turn the page."

TEAR THIS OFF

PEP Mfg. Co., Inc., 33 W. 42nd St., N. Y.

Check free sample wanted

Pep Valve Compound ☐

Pep Bearing Compound ☐

Write name and address in margin in pencil

MA-3-29

BUYING as affected by SELLING

LIST of MEMBERS

Each has subscribed to and is maintaining the highest standards of practice in its editorial and advertising service.

Advertising and Selling
American Architect &
Architectural Review
American Blacksmith,
Auto & Tractor Shop
American Exporter
American Funeral
Director
American Hatter
American Machinist
American Paint Journal
American Paint & Oil
Dealer
American Printer
American School Board
Journal
Architectural Record
Automobile Dealer and
Repairer
Automobile Journal
AUTOMOTIVE INDUSTRIES

Baker's Helper
Bakers Weekly
Boiler Maker (The)
Boot and Shoe
Recorder
Brick and Clay Record
Building Age & The
Builders Journal
Buildings and Building
Management
Building Supply News
Canadian Grocer
Canadian Machinery &
Manufacturing News
Canadian Railway &
Marine World
Candy and Ice Cream
Chemical & Metal-
lurgical Engineering
Clothing and Furnisher
Coal Age
Concrete
Cotton

Daily Metal Trade
Domestic Engineering
Dry Goods Economist
Drygoodaman
Dry Goods Reporter

Electric Railway
Journal
Electrical
Merchandising
Electrical Record
Electrical World
Embalmers' Monthly
Engineering and
Mining Journal-Press
Engineering News-
Record

Factory
Farm Implement News
Fire and Water
Engineering
Foundry (The)
Furniture Manufacturer
and Artisan

Garment Weekly (The)
Gas Age-Record
Good Furniture Maga-
zine
Grand Rapids Furniture
Record

IT IS to your interest to know that goods are well sold, as well as well made. You have to pay the cost of selling just as you have to pay for the cost of manufacturing. Think it over.

And the cost of selling is no small item. In some cases it costs more to sell goods than to make them. The seller who clings to antiquated, expensive methods of selling is no more entitled to your patronage than the one who runs an out-of-date factory, because *you have to pay* the additional costs in either case.

If the waste is to be squeezed out of selling, the buyer cannot escape a share of the responsibility in bringing it about.

THIS means recognizing the efforts of those sellers who have adopted modern, economical methods of selling, and one of these beyond any question is good advertising in good Business Papers.

Advertising not only cuts the cost of selling, but it increases production volume and lowers manufacturing costs. It standardizes quality, and is a guarantee of good faith.

*You are invited to consult us freely about
Business Papers or Business Paper Advertising*

LIST of MEMBERS (continued)

Haberdasher (The)
Hardware Age
Hardware & Metal
Heating & Ventilating
Magazine
Hide and Leather
Hospital Management
Hotel Monthly
Hotel Review

Illustrated Milliner
Implement & Tractor
Trade Journal
Industrial Arts
Magazine
Industrial Engineer
Inland Printer
Iron Age
Iron Trade Review

Lumber
Lumber World Review

Manufacturers' Record
Marine Engineering &
Shipping Age
Marine Review
Millinery Trade Review
Mill Supplies
Modern Hospital (The)
Motor Age
Motorcycle and
Bicycle Illustrated
Motor Truck
MOTOR WORLD

National Builder
National Cleaner & Dyer
National Laundry
Journal
National Miller
National Petroleum
News
Nautical Gazette
Northwest Commercial
Bulletin

Oil News
Oil Trade Journal

Power
Power Boating
Power Plant
Engineering
Printers' Ink
Purchasing Agent

Railway Age
Railway Electrical
Engineer
Railway Engineering &
Maintenance
Railway Mechanical
Engineer
Railway Signal
Engineer
Retail Lumberman
Rock Products
Rubber Age

Sanitary & Heating
Engineering
Shoe and Leather
Reporter
Shoe Retailer
Southern Engineer
Sporting Goods Dealer

Tea and Coffee Trade
Journal
Textile World

Welding Engineer
Western Contractor
Wood-Worker (The)

THE ASSOCIATED BUSINESS PAPERS, INC.

JESSE H. NEAL, *Executive Secretary*

HEADQUARTERS:

220 West 42nd STREET

NEW YORK CITY

LOCATED where you cannot get at it to advantage anyway, and generally rusted stiff from frozen slush and snow, the brake bolt jinx defies you. But, come along with the H & G Socket Wrench and the jinx vanishes as if by magic.



SEE the picture. The Socket fits the adjustment bolt **EXACTLY**. It cannot slip or break. The Universal Joint and Extension brings the Ratchet and Tee Handle out in the **OPEN** where a **POWERFUL LEVER-AGE** can be applied and a nice adjustment made with ease. You could not get a more practical tool for this job, and for all other wrench work about a motor car.

For ADJUSTING Brakes

The box of sockets and parts contains everything you need in the way of a wrench, the equivalent of 122 single-purpose wrenches. And each part is the strongest made. For instance, the sockets are turned from a solid bar of steel, and cold drawn by the Allen Process to form the hex, and then the strength is built up by a special process of heat-treating and hardening. H & G Sockets will not break.

We give the same care and attention to the making of the other attachments. The Ratchet consists of but three parts, simple, strong, reliable; an individual unit which can be incorporated in our speed wrench and used with each socket and part.

Write for complete description and prices with discounts. Please give the name of your jobber or dealer.

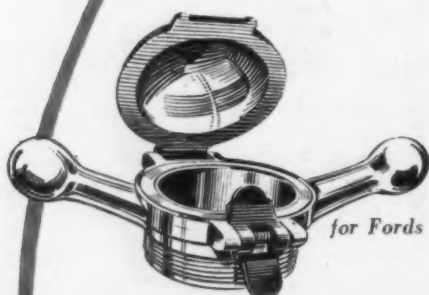
Mr. JOBBER and Mr. DEALER—There are a hundred thousand mechanics holding off buying a socket wrench because they want a good one. They are tired of cheap sets. This is your opportunity. Show a mechanic the H & G Socket Wrench, put it into his hands and let him try it. Feeling and handling this new and better socket wrench will make the sale. You can do a big business and make a handsome profit on this item. We render all kinds of help, national advertising in motor car papers, cuts for catalogs, electros for newspapers, circulars imprinted with your name, and so forth. Write for prices and details.

The Eastern Machine Screw Corporation
10-20 Barclay Street, New Haven, Conn.



SOCKET **H&G** WRENCH

The line is Busy -every single number



Snappy Cap
Bethlehem



De Luxe Model

YES, sir! The line of Bethlehem Betterments is a regular bee-line; and "bee" stands for "busy". The reason the line's busy is because Bethlehem Betterments are just what motorists want, at the lowest prices for which quality merchandise can be sold.

Take the Snappy Cap for Fords—snappy locking, snappy looking. As neat a utility as ever perched on a radiator. And the de luxe model for all other cars. Harmonizes with the fittings on the classiest cars. Makes radiator-filling a matter of seconds.

And the baby of the line—the new Tourack, a sensible, secure luggage-carrier that sells on sight. Tourack took hold the very first day it peeped out of the factory. A lusty youngster, you bet.

**Bethlehem
Tourack**
Carries Your Luggage

At last, a sensible luggage-carrier. Strong, good-looking carries everything from ladies' hand-bag to full-grown trunk. A hit!

Bethlehem betterments

Bethlehem Betterments Have the Call

BETHLEHEM Quickway Wrench-Sets also sell themselves. They're so downright practical. There are now five sets in the line—"A", "B", "C", C-Special and Mechanics' "D". Regular tool-kits that take care of all nuts and bolts on any car. Fast-movers!

You know the old-reliable Bethlehem Spark Plugs—standard equipment on Packard, Studebaker Light Six and other representative cars. Let me tell you about the plug with the petticoat porcelain—as carbon-proof as any plug can be made. And that's that!

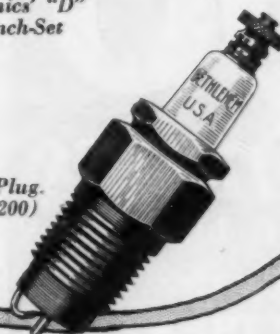
Men, I have gone on record as saying that no merchandise of similar character is as good-looking, as well-built, or as low-priced as Bethlehem Betterments. And there's no line out of which you can make more money, week in and year out. Make me prove it. Write for samples "on suspicion".

BETHLEHEM SPARK PLUG CO., INC.
Bethlehem, Pa.

C. H. Schwab
President



No. 8 Spark Plug.
(Ford Part 5200)



for Motordom



**EXTERNAL
BRAKES
RELINED IN**

**90
minutes**

OR LESS

**By the
MULTIBESTOS
METHOD**

MULTIBESTOS BRAKE LINING

Yes, this letter is on quality, a subject on which manufacturers are pretty much like loving parents. Each thinks his "offspring" the best. But what does the "*other fellow*" think? That's what counts.

Here's what the "*other fellow*" thinks about Multibestos: It has been made factory equipment on the majority of American cars and trucks — such cars, for example, as Pierce-Arrow, Cadillac, Lincoln, Peerless, Wills Sainte Claire, Dodge Bros., Maxwell and Winton.

But we are not satisfied simply with making the best brake lining — we also want to give you the best method of *applying* that lining. So we evolved the Multibestos Method of relining external brakes in 90 minutes or less.

This method means better work at lower cost — more business and bigger profits. Our booklet tells all about it; send today.

E. C. Miner

Sales Manager, Multibestos Company
Walpole, Mass., U. S. A.



Bunting Phosphor Bronze Cored and Solid Bars

For special work in the shop where the wide range of "Ready Made" Bunting Bushings do not apply, use cored or solid bars of genuine Bunting Phosphor Bronze.

This is an all-purpose bearing metal of the highest quality, perfected in our own laboratories, and approved by the machinist the world over.

The splendid uniformity of the metal, and its freedom from flaws, makes machining easy and the result always worth the labor involved. The hole in a Bunting cored bar is always straight.

Cored Bronze Bars are constantly carried in stock in 18 different sizes, and solid bronze bars

in 13 different sizes, at the Bunting factory and all Bunting Branches.

Automotive Jobbers

Write for sizes, weights and prices of Bunting cored and solid bars. Add this splendid line to your stock. Genuine Bunting Piston Pin bushings for all cars, trucks, tractors and motors are shown on list No. 18 and all automotive spring bushings on list No. 111. Write for these lists.

Garage and Service Men

Ask your jobber for genuine Bunting Phosphor Bronze Cored and Solid Bars. Apply genuine Bunting Piston Pin and Spring bushings in all replacements. Any jobber can supply you.

The BUNTING BRASS & BRONZE COMPANY

Toledo, Ohio

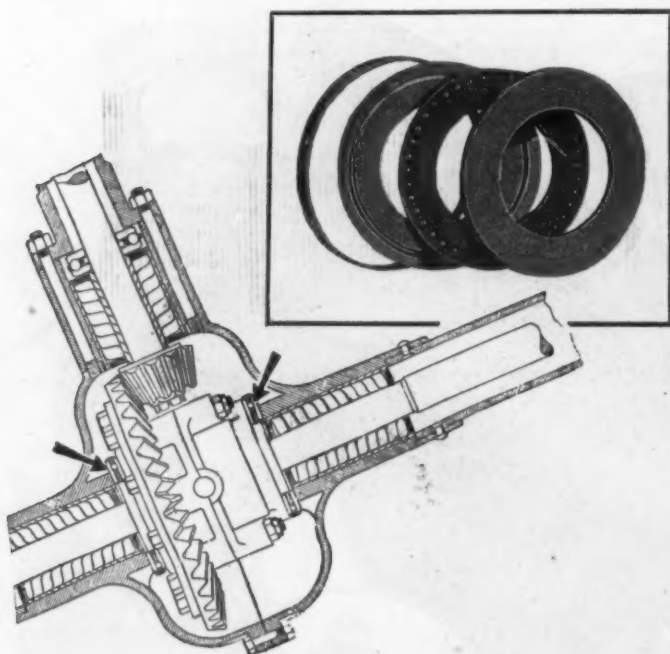
New York
245 W. 54th St. Circle 0844

Chicago
722 S. Michigan. Wabash 9153

Boston
36 Oliver. Main 8488

San Francisco
189 Second. Douglas 6245
Cleveland
710 St. Clair St., N. E.

BUNTING BUSHING BEARINGS



How to Lengthen the Life of the Ford Axle

Repair-work can be SOLD as surely as gas and oil.

Show Bantam Thrust Ball Bearings F-40 to any Ford (or Chevrolet) owner and tell him that they will make his rear axle quiet and practically break-proof for the life of the car.

Every owner wants freedom from noisy gears and axle trouble, better hill climbing, greater gas mileage. You can install F-40 in 90% of the Fords and Chevrolets in your town.

Bantam F-40 takes the place of the plain washers now in these axles. Not a cheap bearing—the best that can be made.

F-40 is absolutely high grade in every respect. Unlike bearings for this purpose which must be renewed, F-40 lasts as long as the car. Builds your reputation as a repairman who does work that LASTS.

Your distributor carries F-40 in stock. If he cannot supply you, write direct to one of the addresses below.



BANTAM BALL BEARING CO.
Bantam, Connecticut

Detroit Office,
905 Dime Bank Bldg.

Mr. F. M. Boyd, The Avon,
6 East Read St., Baltimore, Md.

Frank M. Cobbledick Co.,
103 Polk St., San Francisco

Motor Transport

A magazine for the Fleet Owner, furnishing reliable and accurate news, information and advice on how to economically operate fleets of motor vehicles.

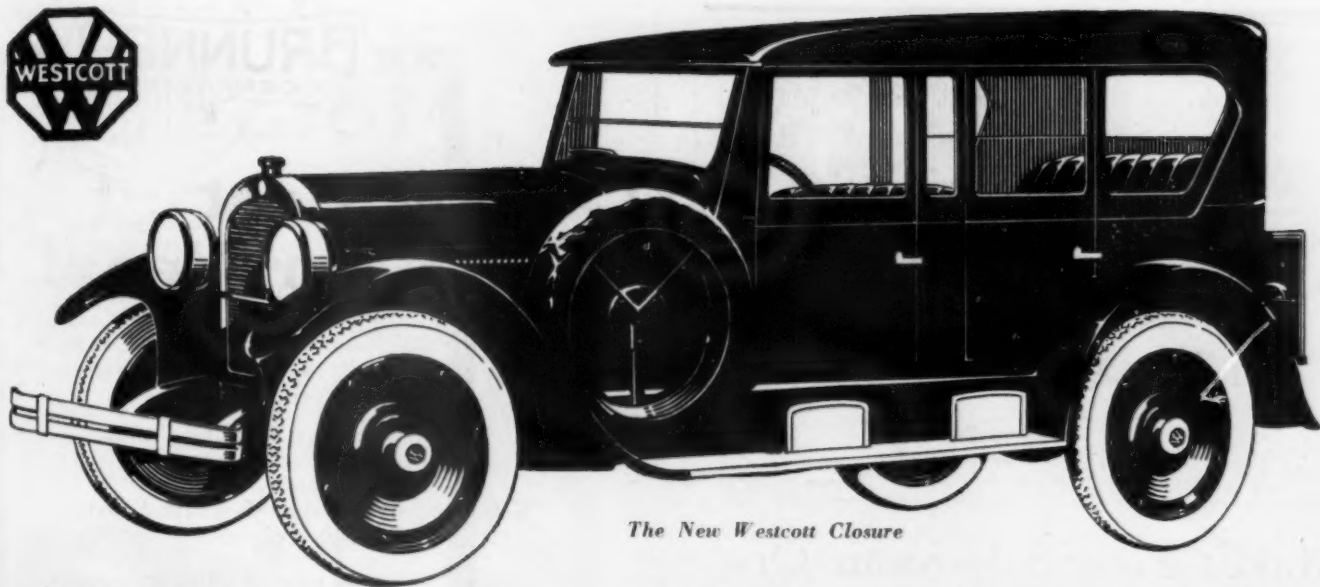
Contains statistics, diagrams and special articles, treating of successful truck operation in all the different trades and industries—Department Stores, Contractors, Shoes, Coal, Wood, Lumber, Dry Goods, Oil Delivery Companies, Bus Lines, Telephone Companies, etc., etc.

Read by leading Fleet Owners throughout the country—men, firms and corporations who own and operate from 5 or 10 up to hundreds of motor vehicles. One subscriber, for instance, owns and operates upwards of 1800 Trucks and maintains 30 Garages and Service Stations. MOTOR TRANSPORT is the only publication in this particular field and is a real necessity to Traffic Managers, Garage Superintendents and others who look after the care and operation of fleets of motor cars, trucks, busses, etc.

MOTOR TRANSPORT is published twice a month, on the first and fifteenth. The subscription price is \$2.00 a year (2.50 west of the Mississippi). Sample copies will be sent upon request.

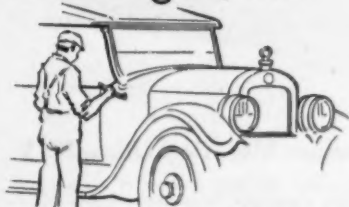
MOTOR TRANSPORT

239 West 39th St.
New York, N. Y.

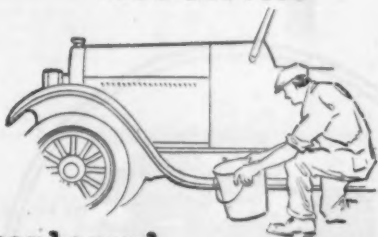


The New Westcott Closure

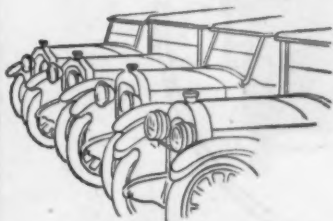
Conditioning expense



Free service



used car hazard



**The profits
you keep-
are the profits
that count**

Westcott Dealers Keep Their Profits

THERE are three "profit absorbers" in the automobile business which every dealer ought to guard against—conditioning expense, free service, and the used car hazard.

But the fact of the matter is that the dealer can't do much towards guarding himself against these losses unless his factory helps to protect him. And that is what the Westcott Company does.

The Westcott Motor Car Company have never believed a dealer should be saddled with expense which legitimately belongs to the factory. Consequently, we have always maintained such a careful system of building and inspection that the cars leave the factory ready to give satisfactory service. Thus, we practically eliminate conditioning and free service expense.

Furthermore, the profit on the sale of a Westcott to the dealer is large enough to assure him of a good net profit even though he may happen to be too optimistic in making a trade-in.

If you have come to feel that your net profits are not what they should be in spite of your best efforts, we will be very glad to discuss the Westcott proposition with you.

The Westcott Line includes the following models: The Closure, \$1795; Sport Closure, \$1995; Brougham (including trunk), \$2490; Sport Sedan, \$2490.

THE WESTCOTT MOTOR CAR COMPANY, Springfield, O.

WESTCOTT

The Car with a Longer Life



Makes Your Salesroom One Big Display Window

Selling motor cars is a business where proper display is vitally important. Old time methods do not fill the need. The merchandise is too large to show up behind ordinary display windows. The dealer requires a building where practically the entire street elevation is of glass.

The above illustration shows how completely Kawneer Solid Copper Store Fronts solve this problem. They make your whole building into one large display window. Abundant light and an unobstructed view make your cars show up in a way that never fails to stop the prospective buyer. And you know how much this visual examination does toward making sales.

Book of Designs Free!

We have prepared an interesting booklet showing Kawneer Fronts which are increasing business for motor car dealers and others. May we send you a copy? The coupon below, attached to your letterhead, brings one without obligation.

Kawneer
SOLID COPPER
STORE FRONTS

Clip and Mail Today!

The Kawneer Company,
1219 Front Street,
Niles, Michigan.

Gentlemen:—Please mail me a copy of your latest Book of Designs.

Name _____

Address _____

BRUNNER
AIR COMPRESSORS

Lowest Cost Per Year!

Brunner Compressors reduce your overhead and increase your profits.

A Quick, Noiseless Start—always!

Silent, smooth-running parts—that last for years.

Speed of Air Delivery—without strain.

Safety of Operation—no breakdowns.

Ask Your Jobber, HE knows!

Brunner Mfg. Co., Utica, N. Y.

Oldest and Largest Makers of Garage Air Compressors in the World.

Sales Offices: Cincinnati, Kansas City, San Francisco, and almost every Jobber from Coast to Coast.



2-Stage 1923 Model

with 20 Exclusive Features, a few of which are:

2. Extra Large Inter-cooler insures low temperature for second stage.
4. Improved Belt Tightener with Hardened and Ground Shafts and Oil-Less Bearings.
5. Ground Bearings, Cylinders, Pistons, Piston Rings, Wrist Pins, and Crankshaft.
6. Removable Cylinders—making repair and replacement cheap and easy.
7. Forked-Type Connecting Rods—minimizing vibration common to most two-stage compressors.
11. Every part Built on Special Tools and Gages insuring absolute interchangeability.
15. Seamless Steel Tank—insures absolute safety. The only compressor made using this expensive type of tank.

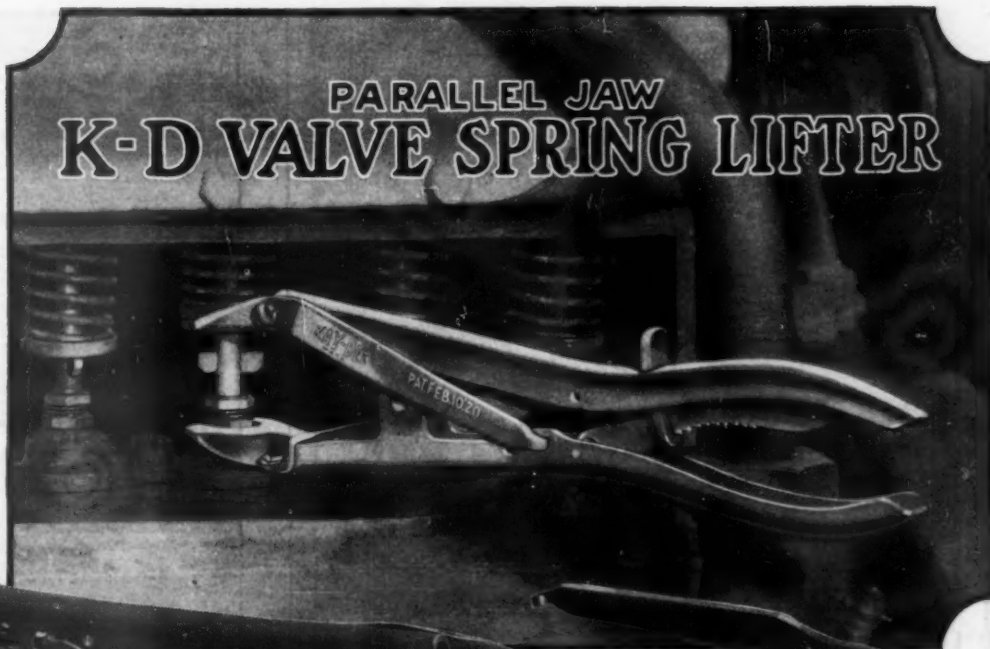
BRUNNER
AIR COMPRESSORS



Note how the jaws remain parallel throughout the entire lift. This exclusive feature eliminates all possibility of the washer or spring binding on the stem and raising the valves.

Also note that there are no hands holding the tool, thus allowing operator free use of both hands.

PARALLEL JAW K-D VALVE SPRING LIFTER



2 Extra Jaws

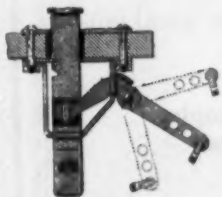
**Prepare Now
for the Heavy
Spring and Summer Repair Work**

The K-D "Universal" fits practically any make of car. Complete with extra set of jaws **List \$2.10**

ATTENTION!

Do you know that two of the largest automobile manufacturers in the U. S. A., namely, The Peerless Motor Car Co. and The Studebaker Corporation of America, have specified the exclusive use of K-D Parallel Jaw Valve Spring Lifters?

K-D No. 100 Cut-Out Pedal



Write for descriptive circular.

List \$1.00

There will be more valves ground and adjusted in the next six months than at any other time of the year. **Are you prepared by having the proper tools?**

The K-D is the **one** Valve-Spring lifter that **replaces** valves as easily as it removes them. Furthermore, they do the work more quickly.

Get these exclusive K-D features

1. Jaws Remain Parallel throughout the entire lift, eliminating all possibility of the washer or spring binding on the stem either in removing or replacing the valve.
2. Locking Device will stay locked in eleven different positions and will hold lifter in place when the spring is raised, thus allowing operator free use of both hands.
3. Extra Jaws, instantly interchangeable, make the tool adaptable to practically all sizes and types of motors.
4. "Parkerized" against rusting and made entirely of pressed steel. Practically indestructible. Guaranteed against defective workmanship and material.

If your regular jobber cannot supply you, write us for description and discounts, and tell us who your jobber is.

**K-D Manufacturing Co.
Lancaster, Pa.**

K-D Special Lifter for Fords and other small cars



All the advantages of the "Universal," with the exception of the removable jaws. Enables you to remove all valves from Ford motor without removing carburetor and manifold **List \$1.10**

USE THIS COUPON

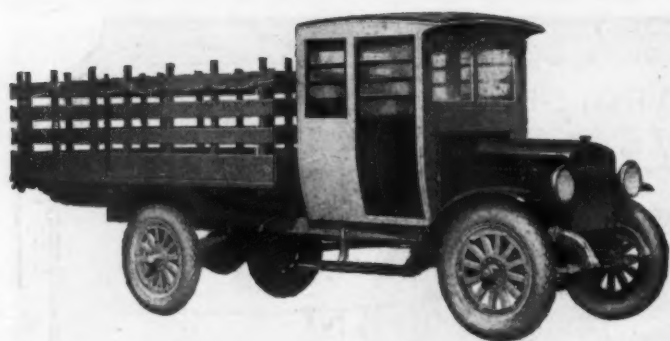
K-D Mfg. Co.,
Lancaster, Pa.

Send me description and discounts on K-D Valve Spring Lifters.

Name.....

Address.....

My Jobber Is.....



A New One-Ton Model

Here is a brand new, husky 1-ton job of the speed type, that is destined to be one of the outstanding truck values for years to come.

This One-Tonner is of the latest design—ruggedly built—great reserve power—ample capacity—a regular bear for work and dependable under all conditions.

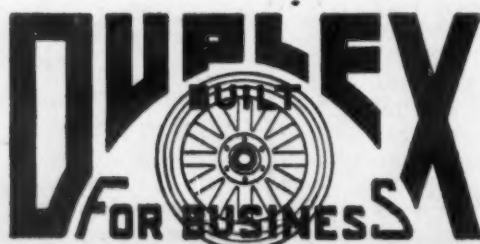
| | |
|------------------------------------|----------------------------------|
| Buda motor | Modine-Spirex radiator |
| Brown-Lipe clutch and transmission | 132-inch wheel base |
| Timken axles | 33x5 Pneumatic cord truck tires. |

There's a big market for this in your territory. An excellent proposition for dealers. Write at once for details.

Duplex Truck Company

Lansing

Michigan



Right on the Top—



Right on the Top
well expresses Dridek
quality in every way.

Absolutely waterproof, can be folded and creased without marring the surface and it stands up under the most continuous kind of hard wear.

Every yard in every piece is carefully inspected both in the finish and in the fabric used and the quality is always the same.

Place your orders where you get your money's worth in service and satisfaction.

Dridek makes the ideal automobile top.

Send for samples
and prices.

L. J. MUTTY COMPANY

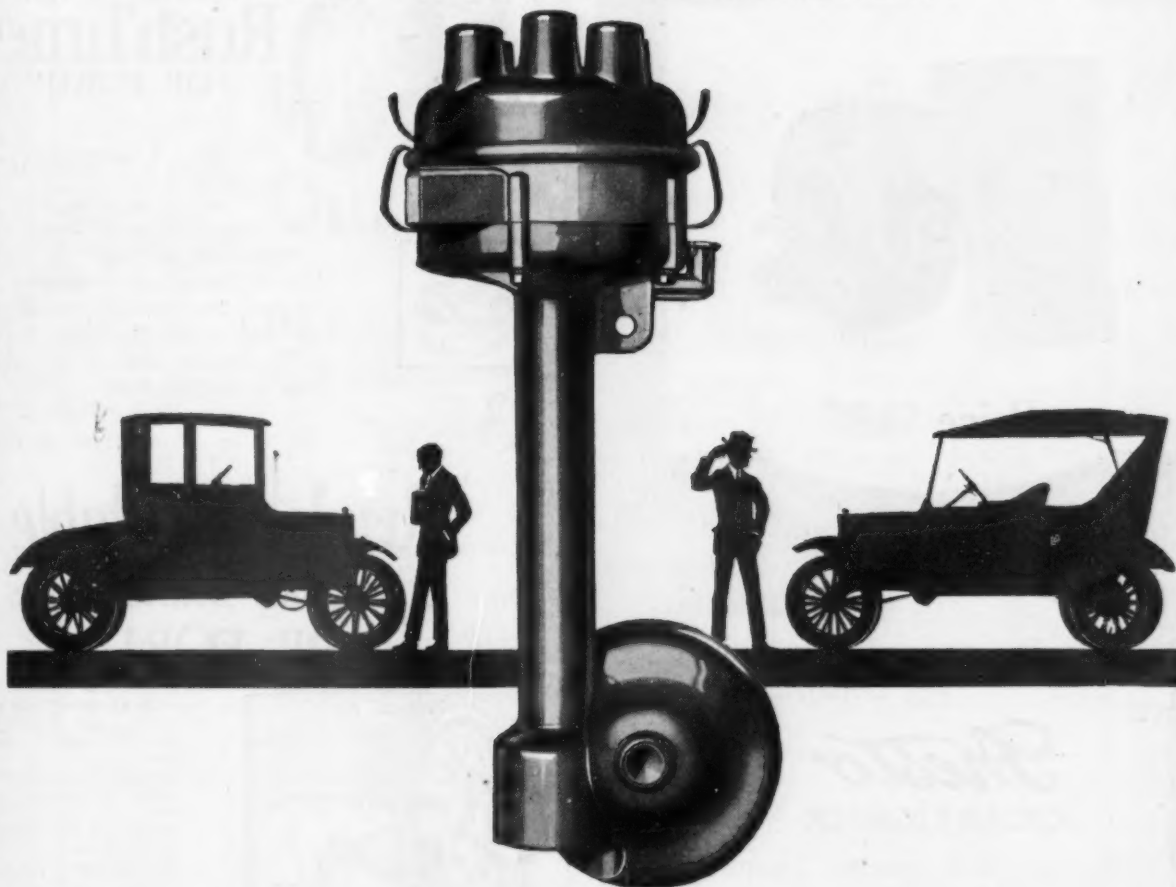
Boston

Dept. C

Mass.

ATWATER KENT

SCIENTIFIC IGNITION



PROVEN ON OVER 50,000 FORDS

Type L. A. Ignition for Fords will improve your motor. It makes prompt starting; smooth and rapid acceleration, greater economy of gas, and practically eliminates vibration at all speeds. Combined automatic and hand spark control.

**PRICE \$10.80 INCLUDING
CABLES AND FITTINGS**

ATWATER KENT MANUFACTURING COMPANY, PHILADELPHIA, PA.
4937 STENTON AVE., DEPT. MA.

Presto Products OVER ONE HUNDRED MOTOR CAR NECESSITIES



Price \$6.00

We Are Pleased to Announce That

The

Presto
CIGAR LIGHTER

Has Been Made Standard Equip-
ment On

CADILLAC
MOTOR CARS

The Presto Automatic Rewinding Dash Cigar Lighter can be easily installed on any car. Current automatically turns on when you pull out the lighter. Cord winder pulls lighter back into socket and automatically turns off current.

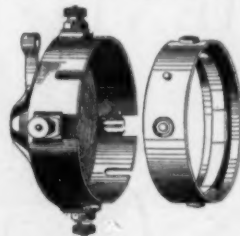
Convenient—Practical—Handy

Write today for illustrated catalog 22, describing this and over 100 Presto Quick-Selling Motor Products manufactured by us.

METAL SPECIALTIES MFG. CO.
338-352 N. Kedzie Ave., Chicago, Ill.

(Why Rush Products) will build business for YOU

Years of hard service have proven their dependability. Sold under a guarantee of satisfaction, or money refunded.



The Dual Contact
Rush Timer
FOR FORDS

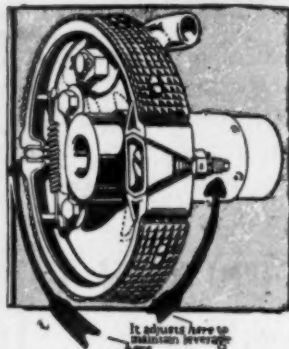


\$3.00

Complete

1. Will not corrugate or burn rough.
2. Produces accurate and continuous firing at all times.
3. Insures easier starting.
4. Runs in cup grease—eliminates oiling.
5. Prevents gum forming on roller or track.
6. Increases gasoline mileage.
7. Works equally well on any Ford car, truck or Fordson tractor.
8. Gives greater timer mileage.
9. Sold under a money-back guarantee.

Rush Adjustable Emergency Brake Shoes FOR FORDS



1. Easily and quickly adjusted without removing wheels.
2. No special tools are required. Only a wrench is needed.
3. Adjustments made do not affect leverage on operating cam.
4. Will take up wear in old brake drum.
5. Braking effect same on both wheels.
6. Positive in action and always dependable.
7. Expose the maximum of wearing surface.
8. Will outwear several sets of ordinary brakes. Per set, \$2.25 cast iron; \$4.50 asbestos lined. Licensed under original patents.



**Rush Piston Ring
Extractor**

Will remove or replace all standard rings, either right or left cut, in a fraction of the time required by any other method. Prevents damaging of piston or ring. Price \$1.50.

Ask Your Jobber.

W. S. RUSH & CO.

Manufacturers.

112 No. DALY ST.

LOS ANGELES

S. S. McCLELLAND CO.

Distributors East of Mississippi.

1926 BROADWAY

NEW YORK CITY

Rickenbacker

A • CAR • WORTHY • OF • ITS • NAME

A • CAR • WORTHY • OF • ITS • NAME

We are Proud of Our Progress

Over 1000 cars a month is certainly indicative of growth. That's our production schedule right now. Getting larger every month.

So are Rickenbacker dealers. And the beauty of it is not only are they making money but they're doing a nice clean business and serving a host of satisfied owners.

And we know that you know how much that is worth.

We would like to communicate with a few more reliable dealers.

Touring Phaeton—\$1485 Coupe—\$1885 Sedan—\$1985
f. o. b. Detroit

f. o. b. Detroit

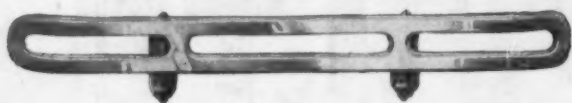
Rickenbacker Motor Company
Detroit Michigan

Detroit

Michigan



RAMSPRING BUMPER



**Smart in Appearance
Perfect in Protection**

RAMSPRING Bumpers are built on principles of shock absorbers but they are vastly more powerful.

The heavy encased coil springs (exposed in the picture) absorb the full force of any impact from any angle, whether a mere bump or a terrifying crash. These coils cushion the shock. Protection with flexibility instead of rigidity!

The Ramspring double channel cross-bar is made of pressed steel and in one piece. It is rounded at the ends to afford maximum bumping surface.

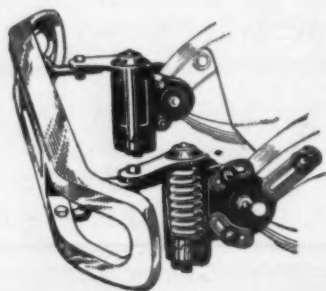
Ramsprings are individual in construction — individual in appearance. They combine beauty and efficiency to a degree beyond any ever offered before.

Dealers all over the country are taking on Ramspring as the one bumper they recommend to their customers without fear of come-back.

*Our new sales franchise is
interesting. Write us.*

RAMSPRING BUMPER CO.

624 West Adams Street : : Chicago



The Coils Cushion the Crash



Reg. U. S. Pat. Off.

SPRING TIME NECESSITIES

When wintry roads are opening up, with all the consequent muck and mire, users of Arrow Grip equipment will rise up and call "blessed" the man who sold them.

These motorists' conveniences are designed for the comfort, welfare and safety of the user.



ARROW GRIP
Pneumatic Tire
CHAINS
with
**Quick Replacement
Fasteners**

Permit cross chain replacements being made with ease and speed. No need to remove chain from tire. The handy fastener does the trick. Fasteners also sold separately for use with other chains.

ARROW GRIP JACKS

Handle Controlled



No back-breaking pumping — no stooping — no grease spotted clothes.

Pushes under the car with the long extension handle. A few easy turns raise or lower the car. Will not topple.

Handle folds compactly. Entire jack stows away in small space.

Three sizes to fit all cars and trucks.

Ask your jobber or write for literature

ARROW GRIP MFG. CO., Inc.

GLENS FALLS, N. Y.

Export Office: 280 Broadway, N. Y.

GATES BELTS

"The Standardized Fan Belt"



90,000 dealers all over the U. S. have found that there's one V belt that gives their customers real service. It's the belt that's built like a cord tire—the Gates Vulco V Belt.

Made by the World's Largest
Manufacturers of Fan Belts.



D & B Silent Timing Gears—the original—are made of laminated fabric and gum combination that is water, oil and grease proof which has greater resistance to wear than metal. Insist upon D & B. Avoid substitutions and imitations.

You Can't Ignore This!

Sales of *D & B Silent Timing Gears* reaching a total of 125,000 in one month, tell a story you cannot afford to ignore if you are looking for the best gear to give your trade.

Over half a million *D & B Silent Timing Gears* in use today, is proof in itself that these gears, through sheer superiority in every detail, are selling themselves to car owners and shop men alike.

We manufacture these gears ourselves—we know what is needed to make them the best for your purpose—we know that if you use them, you will never use any others.

D & B Silent Timing Gears are standard equipment on most of the good cars. There's a reason.



2333 Michigan Blvd. Incorporated Chicago, Illinois

Member of American Gear Manufacturers' Association.

**Without a Holmes Wrecker
Can You Say You Are Fully Equipped?**

You've just done your level best for a new customer, with the idea of pleasing him so he'll bring all his work to you. You stick your card in his door-pocket as he starts away, and tell him to call on you for anything.

One rainy night he dishes a wheel in a concrete drain. What do you do when he calls you up?

Are you Johnny-at-the-rathole with a service car that can handle any sort of wreck in a clean, quick, cheap, workmanlike way?

If you are you've got a HOLMES Auto Wrecker, that's paying you \$100 to \$500 a month clear.

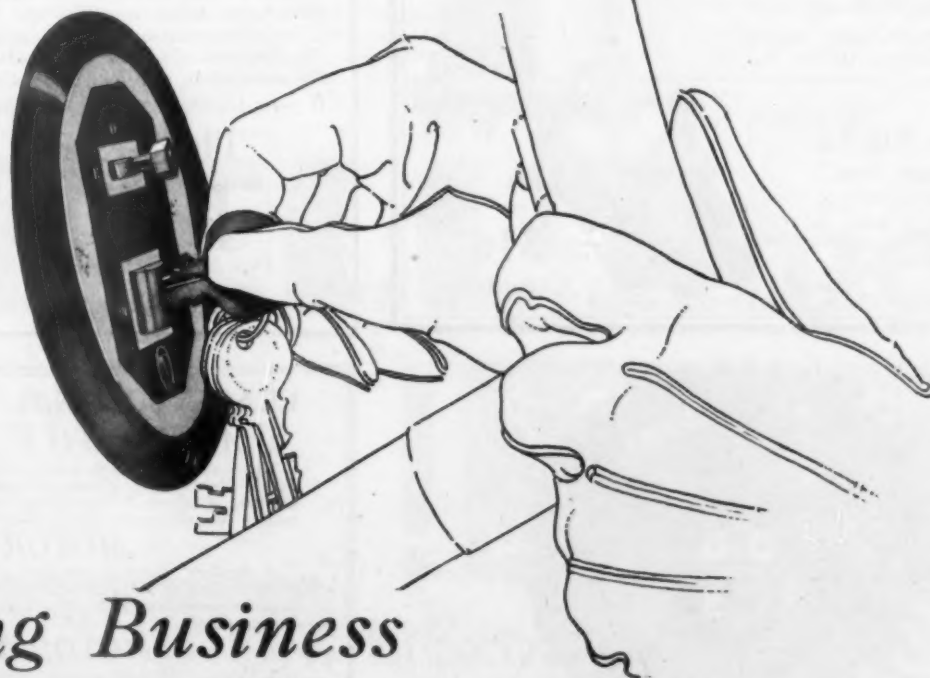
If you are not, you'll do well to write your jobber now for full descriptions, prices and discounts on the

Holmes Auto Wrecker
ERNEST HOLMES COMPANY, Chattanooga, Tenn.

CONNECTICUT

IGNITION

190-y Switch



Spring Business

From now on—all throughout the annual re-fitting season—you will find the

CONNECTICUT 190-y Replacement Switch

one of the most profitable items of equipment you could handle.

Mounted on a round, beveled aluminum escutcheon plate, handsomely finished, with black enamel panel, this switch incorporates such advanced features of design as—

A toggle lever that snaps into "Bright," "Dim," and "Off" positions—

A combination control and locking mechanism in which the key is made to serve as a lever for switching the ignition "On," and "Off," as well as a means of preventing unauthorized use or theft of the car.

Switch block of CETEC, a high di-electric of great mechanical strength.

A perfect mechanism and an ornament to any car. Replaces majority of round type switch, thus eliminating the need for carrying a large assortment of slow movers.

Packed in individual cartons with wiring diagram.

Show It

Price, \$4.50

They'll Buy It



CONNECTICUT
MERIDEN

AUTOMOTIVE IGNITION DIVISION

TELEPHONE
& ELECTRIC

COMPANY
CONNECTICUT



What Good Are Profits If You Lose Them on "Make Goods"?

To make a profit on an overhaul job is one thing—to lose it by having to correct trouble on your own time is another thing. You can protect your profits and insure the good will of your customers by checking the parts before they are replaced. In this way a **WALLER** jig will pay for itself in a very short time.

WALLER CONNECTING ROD AND PISTON ALIGNER

Detects the slightest bends or twists in connecting rods, pistons worn out of round or bored crooked or any misalignment in the piston and rod assembly. Operates within limits of .001 in. \$16.00 complete with Ford size arbor. Bushings for other size crankshafts, \$1.00 each.

Your jobber will supply you. Jobbers—Write for full information.

Waller Mfg. Co.

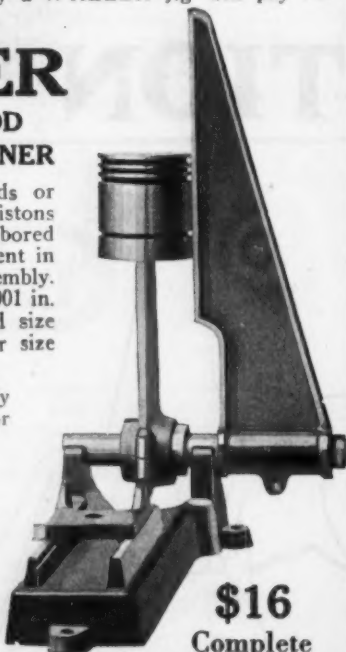
Dubuque, Iowa

(Formerly Oelwein)

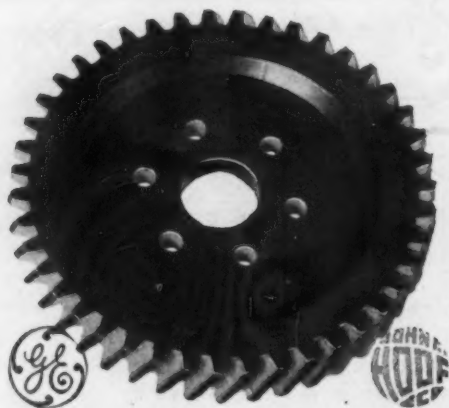
The Clucker & Hixson Co.

Sales Representatives

47 Murray St. 59 E. 11th St.
New York Chicago



\$16
Complete



Silent Timing Gears
for Dodge Cars

Textolite

A General Electric Product

is a gear of impregnated canvas unaffected by heat, cold, oil or moisture and more durable than cast iron.

This noiseless gear will silence the most noisy gear train thus doing away with what is commonly ninety per cent of engine noise.

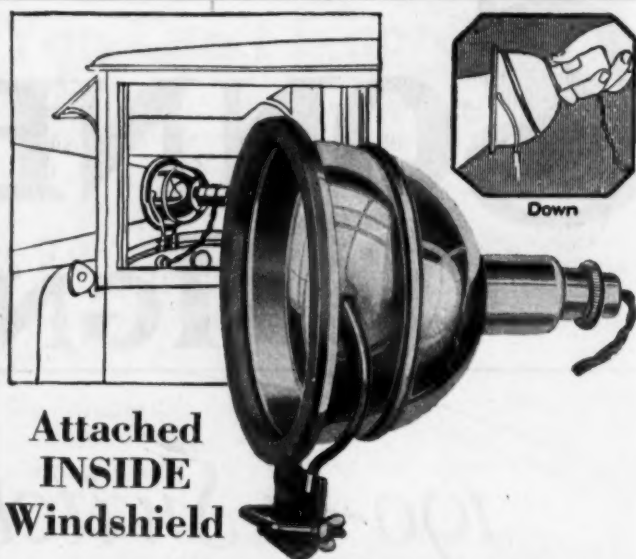
Gears in stock for all cars using gears in the timer drive.

JOHN C. HOOF & COMPANY

157 W. ILLINOIS ST.,

CHICAGO, ILL.

Sole Distributor to the Service Trade



Attached INSIDE Windshield

Mounted right on inside of glass with an invisible bracket. This light means much to the motorist—it has appearance, lasting construction, and is a service light.—Fits all cars. Mr. Dealer:—This product will show you pleasing profits. No installation problem to consider.

If your jobber cannot supply you—write us, mention jobber.

The *Inshield* Spot Light Inside the Windshield

This Light Profitably Merchandized by the Jobber

The Thal & Bitter Machine Co., Toledo, Ohio

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The Engineering and Industrial Authority of the Automotive Field—Motor Cars, Trucks, Tractors, Airplanes. Read by Engineers, Production Managers, and other Executives of Automotive Manufacturing Companies.

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The only automotive export paper going exclusively to Dealers and other members of the Automotive Trade in Latin America.

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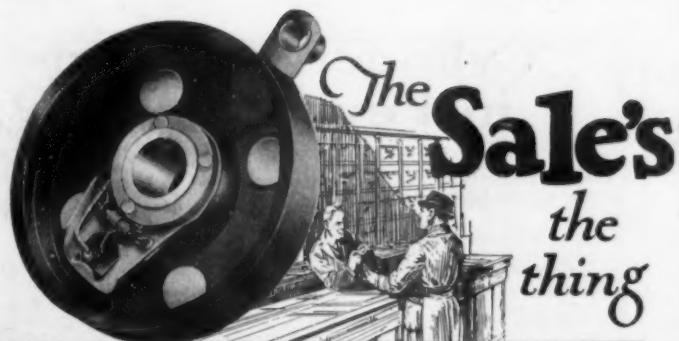
A quarterly publication containing special current information for Tire Dealers—price lists, types, sizes, etc. In constant use by practically all principal tire distributors.

THE CLASS JOURNAL COMPANY

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There Are Many Quick Ones BEHIND the Bell Timer—

And each sale gives the Ford Owner prolonged satisfaction. For Bell's construction is such that perfect electrical contact is permanently maintained. Irregularities of cam shaft motion, wear, shocks are all compensated for. The Bell case is moulded from Bakelite. Dirtproof—dustproof—

waterproof. No oiling necessary. The price is right—and the cartons, sales helps, and special dealer's stand furnish the kind of display that brings quick and profitable inquiries. Dealers—Jobbers. It will be well worth your while to learn the details of our interesting trade offer.

Bell Manufacturing Co.

Boston

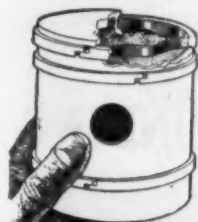
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The BELL Timer



WITH the Bell Rotor, perfect contact and accurate timing is inevitable. A special spring bears against the contact shoe, and if there is any end play of the cam shaft the spring coils automatically wind and unwind—maintaining a constant, even pressure on the raceway. Send for illustrated descriptive data.

List Price \$3



There is but one device made that stops oil pumping and piston slap and renews power in all types of internal combustion engines: It is the Genuine Apex Innering and is fully covered by U. S. Patents. Beware of inferior imitations. Infringements will be vigorously prosecuted.

GENUINE APEX INNERINGS (INSIDE PISTON RINGS)

REBORING is unnecessary. Genuine Apex Innerings will absolutely renew the flexibility, pep and "guts" of all worn motors. Ford or Packard—truck or tractor—motor boat or farm light plant or stationary engine—results are the same: Renewed silence, power, economy, long life.

Have your dealer or repairman install a set today. Retail Price, 30c each up to 5" wide or 5" dia. Larger 50c. Order like piston rings.

DEALERS: Order from your jobber. Capitalize on quick installation jobs and added resale values.

JOBBER: A quick-turning line. Get facts today and list of present jobber connections.

THOMSON-FRIEDLOB MFG. CO.

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Dept. C

Illinois

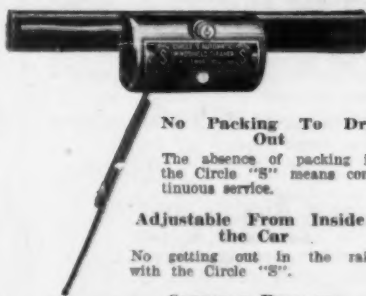


The Guarantee Tag is your protection. Look for it; insist on it. Only Genuine Apex Innings bear it.



CIRCLE "S" AUTOMATIC WINDSHIELD CLEANER

8 Extra Selling Points—



No Packing To Dry Out

The absence of packing in the Circle "S" means continuous service.

Adjustable From Inside the Car

No getting out in the rain with the Circle "S".

Squeegee Pressure Variable

Pressure against glass may be varied or entirely released by inside lock.

No Internal Friction

In the Circle "S" every ounce of power is utilized—nothing lost thru internal friction.

No Pistons—Rods or Vanes

Piston Rods and Vanes use up power—In the Circle "S" there are none.

Can Be Operated by Hand

Can be operated by hand from inside the car to remove heavy snow accumulated while standing.

Inside Lock

Squeegee can be locked up out of the way when not in use.

List Price \$5.00

Dealers and Jobbers—Write us today for sales possibilities.

F. W. STEWART MFG. CORP.
349 W. Austin Ave. Chicago, Illinois

Manufacturers of the well known Circle "S" Swivel Joints.

JOHNSON

Buy From Stock

There is a satisfaction in knowing that, regardless of your requirements in bronze bushings and babbitt-lined bearings, huge stocks of them are always on hand at the Johnson Bronze Company. All virgin metal products, to S. A. E. specifications, obtainable in small quantity lots at big quantity prices.

With an output of more than a million bushings a month, with patterns and tools in stock for practically every type and size of standard bearing, our facilities for prompt and efficient service are probably unequalled in this line of industry.

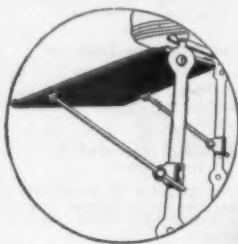
Write today for stock list of bushings and bearings.

Johnson Bronze Company, New Castle, Pa.

Appropriate for the finest car!

Made of 22 gauge steel beautifully enameled—black on outside—green inside.

Has turned-up bottom edge to carry water to side.



The Higgin All Metal Visor goes big because it appeals to all classes of motorists.

This fine staunch visor with its simple efficient means of attachment and adjustment is appropriate for any car.

The Higgin will not rattle nor loosen—its finish stays put—it's a visor to take pride in.

And the price (\$3.50) knocks over sales right and left.

Ask about the liberal discounts.

THE HIGGIN MFG. CO.
Automotive Division
NEWPORT, KY.

HIGGIN ALL-METAL VISOR

Cylinders Resized in Few Minutes

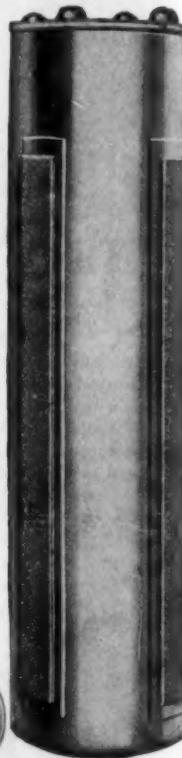
The Auto-Hone has created the biggest stir in the history of shop tools.

A cylinder resized and polished true, smooth and free from all traces of taper, ring travel and unevenness in fifteen to twenty minutes without taking down the engine or removing block from chassis.

Just remove cylinder head and pistons—attach driving handle of Auto-Hone to your shop drill—insert in open cylinder—turn on the power—and the honing stones grind down the usual five to seven thousandths out or round or taper in a few minutes.

Garages and Service Stations are making big profits. Put aside questions and curiosity and get a Hone. Write today.

No skilled help is required to resize cylinders with the Auto-Hone—it is so simple and effective.



The Ultimate Way WET INTERNAL GRINDING

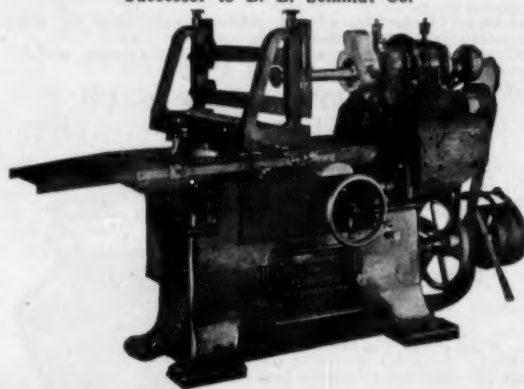
Wet grinding, as made possible by the Micro Internal Grinder is as far in advance of ordinary dry grinding as the present day automobile is over the old ox team.

Micro

The Micro is a highly developed type of internal grinder adaptable for either wet or dry grinding, at the option of the operator, permitting highest quality of results. Its automatic action, both as to cut, feed and table travel provides the most accurate work humanly possible in exceptionally quick time.

If you're going to get a grinder, get the kind that will pay you biggest returns. Our bulletin gives full information—send for it.

MICRO MACHINE COMPANY, Bettendorf, Iowa
Successor to B. L. Schmidt Co.





As a Dash Lamp
Lights instruments and whole front compartment. Driver can see his watch, read maps, write notes, examine goods. Shade keeps light from eyes while driving. Simply clamps on; no holes to bore or tap.

As a Trouble Lamp
Remove bulb and set in handle. Insert plug in socket and ten feet of cord permit light to reach all over car. Indispensable for touring; lights up garage. If more light is wanted, insert headlight bulb.

CLAMP-ON For Fords
Sells so fast you get yours soon

CLAMP-ON is wanted. What's wanted SELLS. You can move a stock so fast that you get your profit quickly. And it's a good one. Installation is ten minutes' fun. Ask the nearest distributor for quotations.

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Products

Quality all the way through—that's why it's guaranteed

Only \$3.50 Retail


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INDIANAPOLIS PUMP & TUBE CO.
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**Most Complete Line
Manufactured in the
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**Dependable
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SPIRAL FLUTE TWIST DRILL

TAP

Moore & Moore, Inc.
Reading, Pa.



**Flexible Spout reaches any oil-hole
or tank on any car.**

Dover Perfected Measures comply with the law—too—of all States.

The right angle positive filling edge—the lip around the top—the definitely indicated point up to where the measure should be filled—

All these features prevent waste—and spilling of oil—besides affording every convenience required in a measure.

Flexible spout is 8 inches long— $\frac{5}{8}$ inches in diameter and is detachable.

This universal measure is a vast improvement and sells fast. Comes in 1, 2 and 4 quart sizes. Order your stock at once and "cash in" on the demand for this handy, convenient utility.

Dover Stamping & Mfg. Co.
385 Putnam Avenue
Cambridge, 39, Mass., U. S. A.

Garages and Repair Shops

Here is an aligning device that will give you greater accuracy in your overhaul work. The Eagle Universal (or Special), Aligning Device helps you turn out work that satisfies your customers. Motors do not pump oil when they are perfectly aligned and gasoline mileage is definitely increased.

THE EAGLE ALIGNING DEVICE

Universal-Special

The Eagle proves wrist pins, bushings, connecting rods and pistons, true and square—before they go into the motor. It will pay you to investigate this superior device. Ask your jobber about it or write us TODAY for information.

Eagle Machine Co.

24 N. Noble Street

Indianapolis, Ind.



\$5.75 COMPLETE

Ford Faithful Oiling System

WITHOUT doubt, the most necessary and valuable accessory that can be installed on a Ford. By consistently delivering an adequate amount of oil to the motor and transmission AT ALL TIMES, burnt-out bearings and scored cylinders are eliminated—greater power and economy, smooth running and freedom from repairs is obtained. Send for our complete folder.

DEALERS WRITE!

THE Ford Faithful Oiling System not only makes money for you but also makes firm friends—customers who being completely satisfied with this article, will come back to YOUR place to supply ALL their needs. Some valuable territory still open. Get our proposition NOW.

W. O. Thompson Mfg. Co.

330 Mountain View St.

PASADENA CAL.

The FORD FAITHFUL Oiling System is patented infringers will be prosecuted

CURTIS SINGLE AND TWO-STAGE AIR COMPRESSORS

Style "V" Two-Stage Outfit



An Original Design

The efficiency of a two-stage compressor depends on how thoroughly the air is cooled in the intercooler. Copper throws off heat faster than any other metal—it is used exclusively on Curtis intercoolers, thus assuring fullest advantage of two-stage compression.

CURTIS is recognized as a pioneer in the air compressor field. Sixty-nine years' manufacturing experience, twenty-six of which have been devoted to pneumatic machinery, has enabled us to develop compressors entirely original in design. As a result, Curtis Outfits have many exclusive features that assure dependable service with minimum upkeep.

Get the Facts

We manufacture a complete line of single and two-stage outfits—a size, style and arrangement to suit your needs. There are definite reasons why you should insist on a Curtis. Write at once for full details—our proposition and prices.

CURTIS PNEUMATIC MACHINERY CO.

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Branch Office:

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Canadian Representative:

Joseph St. Mars, Winnipeg and Toronto, Can.

FIRST AND ONLY Two-Stage Compressor with a Copper Intercooler

Always Look For the Name ROBERT BOSCH and this TRADE MARK

Type ZU4 Magneto

AN ASSET OF ENDURING VALUE

The Franchise governing the sale of

Robert Bosch Magnetos—Spark Plugs Horns—Spot Lights

Some good territory open—we have an attractive proposition for live Dealers.

Write for details at once.

Robert Bosch Magneto Co., Inc.

OTTO HEINS, President

123 West 64th Street, New York
Chicago Branch: 1302 South Wabash Ave.

The Genuine, Original Bosch Means Robert Bosch Only

The Hydraulic Control

More Than a Shock Absorber

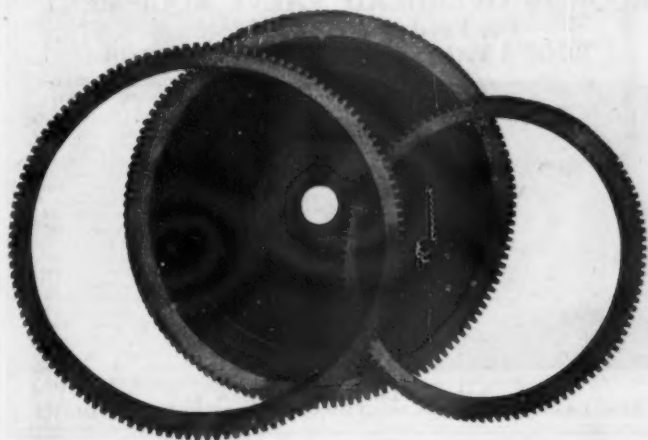
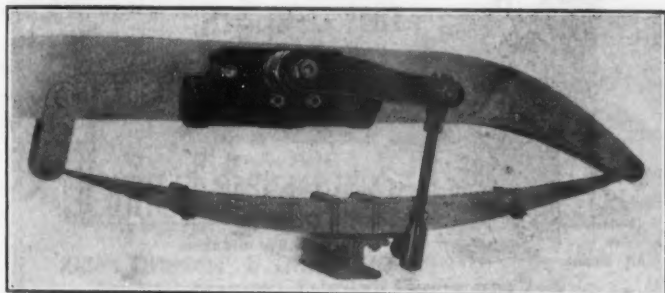
The Hydraulic Control consists of a double-headed piston playing back and forth within a double-headed cylinder, against oil which is permitted to escape through by-passes and regulating valves so that the movement of the piston and the body of the car is retarded by the fluid contents of the cylinder.

Easy to install — long life (all parts work in a bath of oil)—wonderful performance backed by records of achievement in service—make the Hydraulic Control an exceptionally fine proposition for the Distributor and Dealer.

The Hydraulic Control FLUID-Cushions the Shock.

Write for details.

AUTO SPRING CONTROL COMPANY, INC.,
Jamestown, New York



Get Meachem Prices on Fly Wheel Rings

Quantity production of highest quality fly wheel ring gears enables us to quote surprisingly low prices. Write for price list. Ten thousand in stock for immediate delivery.

THE MEACHEM GEAR CORP'N
Syracuse, N. Y.

How Much Acetylene Do You Buy A Month?



200 Cu. Ft. a Month? If you do, then a Smith Generator will save you as much as \$90 per year.

500 Cu. Ft. a Month? That will pay for a Smith 30 lb. Acetylene Generator, a year's supply of carbide, and leave you \$50 besides.

1000 Cu. Ft. a Month? Then you can install a Smith 50 lb. Generator, buy a year's supply of carbide, and increase your profits by over \$200.

All the Gas You Want—When You Want It

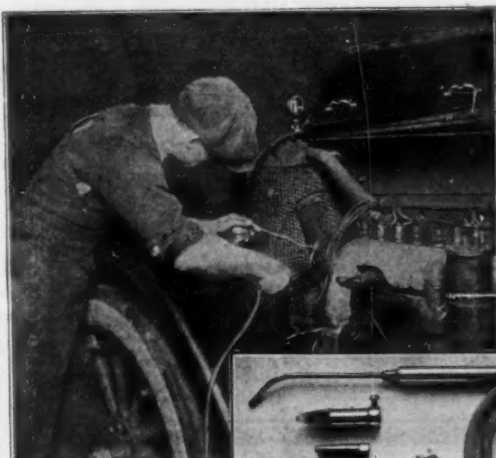
Cheaper acetylene is only one reason for installing a Smith Generator. Smith generated acetylene contains no acetone to spoil welds. Smith Generators give a safe and always sure supply of gas. No waiting in the middle of a job for another cylinder. No disappointing the customer on service you have promised. No wasting of welders' time.

Send for Booklet:
"Why A Smith Generator."

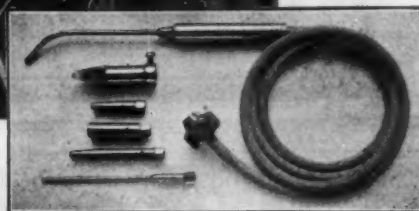
**SMITH'S
INVENTIONS
INCORPORATED**

Minneapolis

Exclusive
Manufacturers of
Welding and Cutting
Equipment.



Instant Soldering



Ready to Use the Second You Light It Torit Acetylene Torch No. 13

This is a wonderful torch for all kinds of soldering, brazing, pre-heating, babbitting, radiator repairing, splicing wires, etc. It is a time saver and enables you to quickly do a range of work that a soldering copper alone cannot do. Garages cannot afford to be without the Torit Outfit No. 13.

Uses Acetylene Only

A splendid use for discarded auto acetylene tanks. Many owners make the Torit No. 13 pay for itself in a single day. Torch with 4 different tips, soldering copper, 5 ft. tubing and connection for auto acetylene tank. **\$7.50**

Order from your jobber or

St. Paul Welding & Manufacturing Co.

109 W. Third St.,

St. Paul, Minn.

E-C-L Pistons

ALUMINUM ALLOY NON EXPANDING



How to Eliminate Piston Slap

Piston Slap is a common and vexatious cause of engine trouble which in the past has bothered most car owners. But it can now be eliminated. With the E. C. L. Aluminum Alloy Non-Expanding Piston, E. C. L. Pistons may be fitted with a closer degree of clearance than cast iron pistons. They reduce the consumption of gas and oil — increase power and speed and eliminate spark knocks. Let us tell you more about this remarkable piston. Write for the details today.

E. C. LONG

Main Office and Factory

4834 Beaubien Street

Detroit, Mich.

FOLLETT'S NEW MODEL TIME STAMP

—accounts for every labor minute

Prints the year, month, day, hour, minute, A. M. or P. M. at the exact moment the plunger is pressed—like this, for example:

NOV 19 1920 4 31 PM



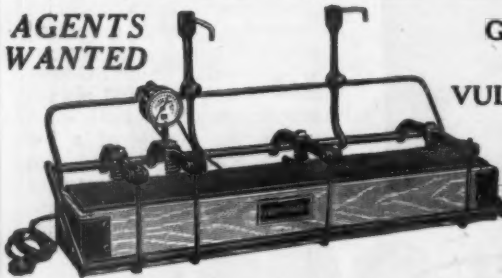
Learn the interesting details from our descriptive data.

Tells when a job is started—and when it is finished. There can be no dispute over the time charge.

Absolutely automatic—except for winding. Special machines, with as many as six different words, can be made. Every machine guaranteed.

Follett Time Recording Co., 7 West Broadway, New York City

AGENTS WANTED



GEE-BEE TUBE VULCANIZER

Steam Pressure, Electrically Heated, Automatic Control, Fire Proof, Efficient and Economical

Big profits for garages, repair shops and tire men with the Gee-Bee Tire and Tube Vulcanizer. Best and most reliable on the market. Few parts—nothing to get out of order. Patented automatic heat control. Cost less to operate than gas or gasoline. Made in all standard sizes. Low in price. Write for full particulars.

CHASE MFG. CO., 3220 Morgan St., St. Louis, Mo.
Successors to Gwynn-Bacon Vulcanizer Co.

Tip your coppers with Ruby as a flux for brass, steel, copper or galvanized iron, use Ruby full strength.



For All Metals

Free Trial Sample Sent At Your Request

Rubyfluid

TRADE MARK REG.

Combination SOLDERING & TINNING FLUX

THE RUBY CHEMICAL COMPANY

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REGRIND BEARINGS



OUR REGRINDING PROPOSITION WILL CUT DOWN YOUR BALL BEARING BILLS. TRY US AND BE CONVINCED. SATISFACTION

GUARANTEED
AHLBERG BEARING COMPANY

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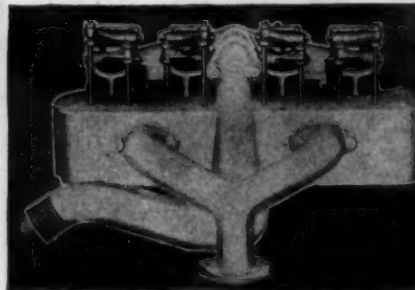
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ROOF 16 OVERHEAD VALVE EQUIPMENT For Ford and Dodge Motors

ROOF 8 VALVE HEAD FOR FORD MOTOR



Stupendous Power—Lightning Speed

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete — ready for installation — no machine work necessary. We are headquarters for all speed equipment. No matter what you want, write us. Racing quality — lowest prices. A postal card brings you complete list of our specialties.

Jobbers—Dealers—Consumers—Write Us
THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA

INSURES A TOW HOME



BASLINE AUTOWLINE

Just use a natural, easy pump action to grind valves

SIMPLICITY VALVE GRINDER

Price
\$2.50



The simplest, sturdiest speed grinder made — so designed that you can do with it whatever the hardness, size and conditions of the valve requires.

With a natural, easy pump motion, the Simplicity Valve Grinder furnishes the repair man with a tool that turns out a finished job quickly and effectively. Its oscillating motion insures an even pressure on the valve at all times. Stroke never stops twice at the same place. There is no complicated series of gears, cams or pins to wear out.

Carried in stock by all jobbers. Our literature gives the details.
Universal Equipment & Supply Co.
Syracuse, N. Y.

THERE ARE PARTICULAR WALDEN-WORCESTER SOCKET WRENCHES FOR PARTICULAR PARTS OF EACH PARTICULAR CAR



For over sixty makes of cars and trucks in general use today, Walden-Worcester has Service Selections of Socket Wrenches—each selection especially adapted for particular parts of the particular car for which it is designed.

Your Jobber can supply you with any or all Selections from his stock. Write him.

WALDEN-WORCESTER

Incorporated

General Offices and Factory

Worcester, Mass.

New Departure Ball Bearings



BLACK & DECKER QUARTER INCH DRILL



\$28.00

"With the Pistol Grip and Trigger Switch"

THE BLACK & DECKER MFG. CO.
Towson, Md.

PARANITE CABLE

Best for Automotive Work

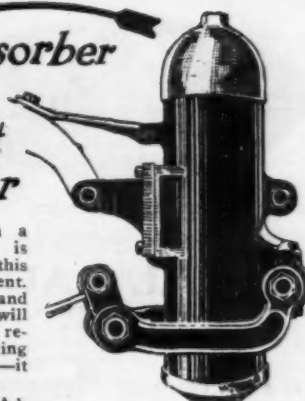
We carry at all times a complete stock of every kind of cable used for automotive work. Many years of specialization have brought **PARANITE** Cables to the highest state of perfection. The finest grades of rubber compound, cotton and flexible enamel varnish are used.

FOR 33 YEARS THE STANDARD
IF IT'S **PARANITE** IT'S RIGHT
Quality jobbers handle quality cable—that's **PARANITE**.

Indiana Rubber & Insulated Wire Co.
210 S. Desplaines St., Chicago
Factory and General Offices—Jonesboro, Ind.



*If a Shock Absorber
will do this
it Spells Profit
for the Dealer*



One demonstration in a community is all that is necessary to prove this "steam roller" statement. It will then sell itself and the one lucky dealer will be the one gainer. It requires no extensive servicing to eat up sales profit—it means clear, easy profit.

What's your name? Address?



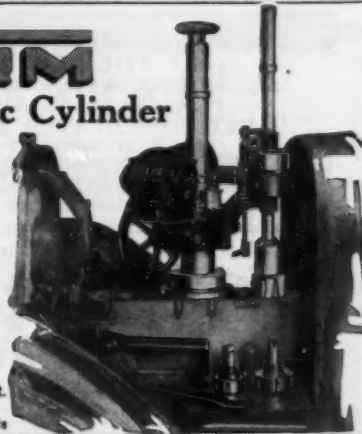
STORM Automatic Cylinder Finishing Machines

For cylinder finishing only. Designed for use with any reliable boring equipment. Also for truing up slightly worn cylinders without previous machining operations.

Storm Cylinder Finishing Heads are for use with drill presses or electric drill.

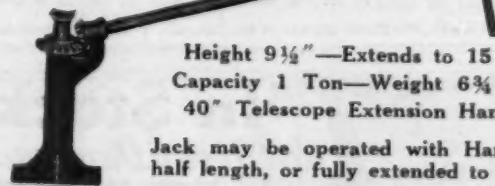
Write for catalogue.

STORM MFG. CO. Dept. A
406 6th Ave., S., Minneapolis



The SPRINGFIELD JACK No. 1

[Ball Bearing]



Height 9 1/2"—Extends to 15 1/2"
Capacity 1 Ton—Weight 6 3/4 lbs.
40" Telescope Extension Handle

Jack may be operated with Handle at half length, or fully extended to 40".

View Showing
Handle Half
Length 20"

Manufactured by

The Shawver Co., Springfield, Ohio

RELIO
The Van Norman
VALVO


Relio, an electric-drive wet grinder for pistons, pins, valves, bushings, \$475.00. Valvo, an electric-drive bench grinder for valves, valve-seat reamers \$175. See page ads this paper.

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When you find Ames dial gauges in the finest automotive shops, on close limit work — there's a reason. Let us tell you why. Write TODAY.

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Waltham, Mass.



(1959)

Strom
BEARINGS

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All-Size Step Plate fits all running boards by simply moving the plate forward. Welco Ford Accelerator works independently of hand throttle; very easy installation. Welco Blanket Holder keeps blanket securely on radiator against strongest wind. Write for trade proposition.

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WELCO Products

DO THE JOB RIGHT!

Keystone Expansion Piston Pin Aligning Reamers
Ask for 1922 Reamer Bulletin

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Let us send you our FREE Catalogue on

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Fly-Wheel Gear Bands

Huetter Machine & Tool Co.
545 Kentucky Ave. Indianapolis, Ind.

NO-LEAK-O PISTON RINGS

Won't Leak Because They're Sealed With Oil

"NO-LEAK-O"
OIL SEALING
PISTON RINGS

No-Leak-O Piston Rings are making money for dealers everywhere. Their "oilSEALing" groove—found only in No-Leak-O—packs an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell No-Leak-O by teaching the motorist the lesson of more mileage on less oil and gas.

It will pay you to stock No-Leak-O at once.
Price 50c and up.

NO-LEAK-O PISTON RING CO., Dept. T-57, Baltimore, Md.

"In Stock — Not Over a Day Away"

Write Milwaukee Die Casting Co., Milwaukee, Wis., for name of distributor nearest you.

MILWAUKEE BEARINGS



WEAVER
GARAGE
EQUIPMENT

WEAVER
MANUFACTURING
COMPANY
SPRINGFIELD
ILLINOIS
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TAKE THE END-PLAY OUT!
—WITHOUT PULLING THE MOTOR

THE C. A. ADJUSTABLE CENTER BEARING CAP corrects Ford crankshaft end-play and sets magnets for highest efficiency without removing the motor. Easily and quickly installed. Guaranteed for one year. List price \$3.75. Ask your jobber or dealer or write us direct.

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The Fox CYLINDER GRINDER
LATHE ATTACHMENT

Get into the big shop class. Own a fine cylinder grinding outfit for less than \$500. Easy terms. Fits your lathe. On or off in ten minutes. Write today for booklet of complete information.

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GEAR
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Silent Timing
GEARS

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Michigan Ave.
CHICAGO

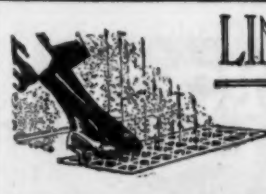
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Warms any car, open or closed.
No odor, smoke, dust or noise.
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FLOAT THE CAR ON AIR!

Can be installed by dealer who sells them. Big opportunity for distributors and dealers—sales are easy—discounts long. Write.

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ELECTRICAL
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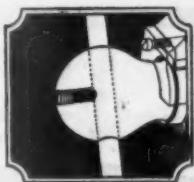
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Have Handles That "Stay Put"

Note the set screw and spring. This prevents the handle from slipping and pinching the fingers, as often happens on ordinary vises.

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They Grip
Like a
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Imitations Do Not Have Quality of Originals



New Duo-Convex Bumper with back bar reinforcement. Double convex spring bars with graceful stream lines. Black or full nickel. \$15 to \$22, according to size and finish. Without back bar, \$12.



The New Duplex Sport Model. Most beautiful bumper on the market. Black japan or nickel. Medium cars, black, \$14.50, nickel \$16.50. Large cars, full nickel only, \$24.

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New Era
Bumpers
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They are superior in design, construction, materials, installation appearance, finish, guarantee. Fit all cars. Twenty styles. Easiest to sell. Convince yourself.

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For melting lead, babbitt, solder, zinc, etc. Pot holds 25 lbs. of metal. Torch used for heating soldering irons or any pre-heating work.

Has the Johnson Direct Jet Bunsen Burner with shut-off valve and pilot light.

This Burner will produce a flame temperature of 2250° without the use of any forced air blast.

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The Garage Special



Electric Drill and Valve Grinder

That saves every garage or repair shop time and money.

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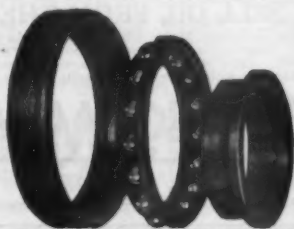
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High Torque Motors

Capable without exception. Powerful without wasteful speed. Known from coast to coast, and demanded by that class of motor owners who recognize true motor endurance and reliability under most exacting conditions.

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MOTOR CAR EARL MOTORS, INC.
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Monogram Light Distributors

Standard Equipment on 30
of America's Foremost Cars
Write for Prices.

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51-6/10 MILES ON A GALLON OF GAS

It is the official world's record-breaking test with Ford Touring car. The new 1922 Stromberg Carburetor and Hot Spot did it—made this marvelous mileage possible. Tens of thousands of Ford owners are now obtaining more miles on a gallon—quicker getaway—easier starting—increased power and speed—all because of having their cars so equipped. Live dealers are requested to write for facts pertaining to territory.

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Auxiliary firing-chamber gives it the explosive power of a howitzer. Carburetor must be adjusted LEANER immediately. Overcomes oil, self-cleaning. Retails \$1. Distributors wanted.

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With the Explosive Spark
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Small Cash Investment—Big Monthly Earnings
Small cash payment brings HB 8 Hour Battery Charging. Only \$30 monthly pays for outfit. Long free trial on money-back guarantee. No experience needed. Saves on labor, current and rental batteries, increases business and profits. Be the leader in your town with HB 8-hour charging. Write for information.
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As we have reduced the price on Red Giant Rim Tools to \$3.25 to dealers, you cannot afford to let this opportunity pass to get a real rim tool at a cheap price.

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A ring for every purpose—Spiral Cut, Oilless and StepSet—and a complete line of semi-steel Replacement Pistons and high-grade Piston Pins. Write for details.

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Models range from the 2,000-lb. Speed Truck to the 10,000-lb. truck. Some territory is still open for dealers.

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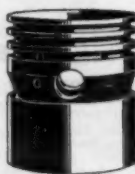
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Write today for Bulletin M-18.

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Motor Wheel Corporation, Lansing, Michigan



DOUBLE SEAL OIL-CONTROL-PISTON

This hook-shaped groove catches the excess oil and returns it to the crankcase through holes in the bottom of the groove. Oil troubles are unknown with this piston. Used by many car builders as standard equipment. Write for our dealer proposition.

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Distinctive in Appearance.
Most powerful in action.
Most durable in operation.
Sells on sight.

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The Original Ignition Gauge Utilizing Neon
Instantly locates spark plug and other ignition troubles. Place it alongside the oil can for convenience. Test the spark plugs every time you oil the car. The motor will purr its appreciation.

\$1.00 with Clip and Screws
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Pioneer in commercializing the elements of the air.



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The Correct Measure Motor Oil Display Pump will increase your oil business. Handsome. Compels attention. Delivers 1/4 gallon in 12 seconds. Can be put on curb in morning—and back indoors at night. \$45 per unit. Write for details concerning this money maker.

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MOTOR OIL DISPLAY PUMP

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The
Self Locking Radiator Cap



COMPLETE YOUR SERVICE STOCK
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BRAKE LINING
Unequalled in its Performance
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Let your customers hear the Sparton speak!
Special display board given free with initial order for six. Write for complete particulars.
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Automobile and Radio batteries charged for a nickel. Ten million car owners and five million radio fans are prospects for
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BIG PROFITS. WRITE NOW.
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Cylinder — Internal — Surface
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Do not overlook these live selling and profitable items. The metal is brass, heavy nickel plated and will not rust.
Four styles—one for every car. No. 503 with the Hump Base. No. 504 with Ell Base. No. 505 Plain Lock-Type. No. 506 Swivel Lock-Type.
Packed fifty to carton; five display cards of ten each.
The company that took the rattle out of Anti-Rattlers
THE AUTOQUIP MFG. CO., Inc. 495 St. Paul St., Rochester, N. Y.



DAYTON AIR COMPRESSORS
Automatic Control. Automatic Release.
Start against no load.
Style E-2: 2 3/4 cu. ft. per minute.
140 lb. pressure. Tank 16x36, 32 gallon.
25 ft. hose with air chuck. 1/2 H. P. Motor.
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WEIGH LIGHTEST · FIT TIGHTEST
Regrinders, Repair Men, Dealers
Write for literature, price list and liberal proposition. Prompt service and delivery on all standard and special oversizes up to .065. Over 600 models.
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Nine body types,
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THE COURIER MOTORS COMPANY
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SILENT TIMING GEARS IN MANY LEADING CARS ARE MADE FROM



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Of the Same Genuine Fedders Quality
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OVER 50 WONDERFUL SHORT CUTS IN NEW CATALOG T-105
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TASCO Visible Gas Gauge for Fords. Insert in place of regular gas tank cap. Just lift the cushion. Quick—accurate. \$1.25. Every Ford owner. Order from jobber or direct. Liberal discount.

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Indicates definitely direction driver intends to turn. Signals at both front and rear of open or closed cars. Meets requirements of all State laws. Attractive—Durable—Effective.

Traf-i-kop
SIGNALS RIGHT, LEFT, GO OR STOP

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Norwalk, Ohio

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DUESENBERG
Original Straight Eight

Duesenberg Automobile & Motors Co., Inc., Indianapolis

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LIGHT—PORTABLE—STRONG

Can be hooked up and plugged in anywhere. And where electric current is not available, the hand chain can be quickly applied—and the hoist operated as an ordinary chain block. Saves men, money and time. Learn the interesting details.

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FOR FORDS

A better bumper at a better price with Underwriters' Approval

NEW YORK WIRE & SPRING CO.
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MR. DEALER

For quick, sure sales and big fat commissions, you can't beat the Dunn Products.

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Piston Rings for Every Need

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Fewer Parts — Better Attachments

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JUNIOR— $\frac{5}{16}$ " x $\frac{1}{4}$ " oil tempered spring steel single bar with two "eyes". Fits all cars. Black \$14.50. Nickel on copper \$16.50.

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SAMPLE FREE

BOWSER
ESTABLISHED 1885

ACCURATE MEASURING PUMPS

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"The Only Ring With a Mileage Guarantee"

"Sav-Oil" is stamped inside of every ring

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Protects Generator, Lights and Battery

An inexpensive money saver. Should be on every car.

Attractive dealer offer.

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Visible Gas Pump

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Prompt shipment, highest grade materials, precision accuracy to closest dimensions and unexcelled workmanship. Send for specification and price lists—they make pin and valve buying simple.

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Tires and Tubes

"Wear Longest"

THE NEW EMPIRE DISTRIBUTION PLAN

enables dealers to make extra profits on these well known super-standard casings and tubes.

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TRENTON NEW JERSEY

HANDI-PAN

Like a Pocket in a Shirt

Has many uses. Drain crankcases, test tubes, scrub parts, carry tools, keep parts, throw scrap in it. One piece of heavy gauge galvanized steel. Won't tip over. List price \$2.50. West of Rockies \$3.00.

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Sales Dept.
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"DUPLEX" \$5

Second Spare Tire Carrier And Rim Tool All-In-One

Attached or removed without tools, no installation cost, no time wasted, sale is complete over the counter.

Does a \$10 job for \$5

Locks both tires—Tires cannot chafe—Does not interfere with the use of tire covers—Improves the appearance of a car—Does a 100% job as a rim contractor and expander—Can be transferred from one car to another—Only one size to stock for all.

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Fast and ACCURATE for re-facing, reseating and grinding all size valves.

Garage Tools
make well equipped shops. Ask your jobber.

Sioux Flexible Shaft and Attachments take the tool to the work.

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Fours exclusively—highly developed

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"Once an Owner, Always a Friend"

The complete Auburn line of 1923 including the Smaller Six provides a most attractive business opportunity for the dealer.

Auburn Automobile Company, Auburn, Indiana

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FOR FORD CARS

Makes riding and driving a pleasure. Eliminates road shocks and hard steering, spring breakage, shock absorbers. Write for our money making dealer proposition.

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The Bear Tractor

Write today regarding unassigned territory, and ask for catalog and distributor's and dealer's proposition.

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The Tractor that Delivers its Power to the Drawbar

BROWN-LIPE-CHAPIN DIFFERENTIALS

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Cyclo "Dynamic" Hot-Spot For Fords

25 to 30 miles per gallon is the rule rather than the exception among CYCLO users.

VACUUM HEAT-CONTROL
insures plenty of power under all conditions.

Ask about our "Rapid Transit" selling plan

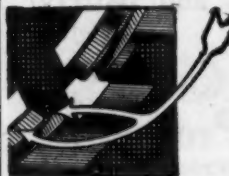
Cyclo Manifold Co., High & Chestnut, Akron, Ohio



Should Be On Every Car
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The Spencer Lock Tilting Steering Wheel first adds comfort in the driver's seat—then protects the car from theft. And the insurance it saves pays back the purchase price. Ask your jobber for details. Made for Ford, Dodge, Overland, Chevrolet 490 and Superior, Maxwell, Star and Gray Cars.

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Automotive Division

KING SEWING MACHINE CO.

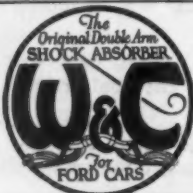
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It's Better Than Shellac for Motor Gaskets
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ANY MODEL

ANY YEAR

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with
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pistons for Ford motor
(12 oz.)

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PISTONS

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Compute six words to line.
Forms close Thursday noon each week.

Situation Wanted

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LAMMERT & MANN CO.

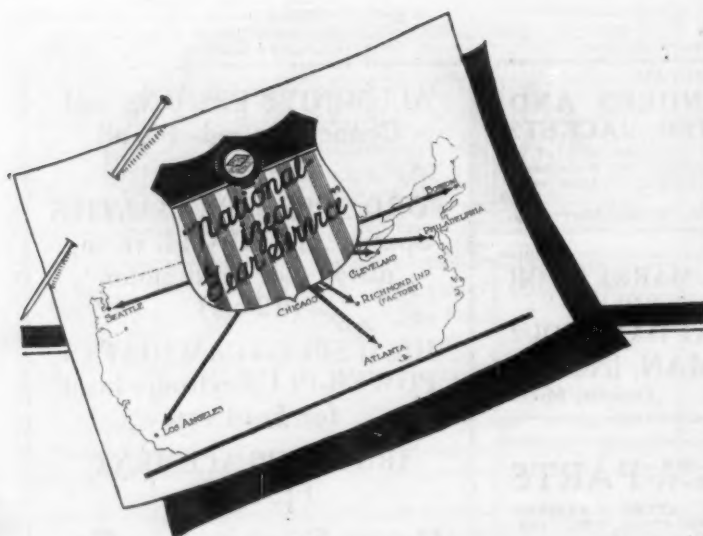
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SPECIAL LIGHT WEIGHT
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PISTONS—RINGS—WRIST PINS
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With every Double Diamond Gear goes a positive guarantee of complete satisfaction. When you consider that this guarantee is issued by a nationally known concern with a reputation for honest, trustworthy methods and reliable merchandise you may be sure that the guarantee will be carried out to the letter.

You can depend upon the quality of Double Diamond Gears as thousands of service men have learned by experience.

We also supply fly wheel starter ring gears, rear axle shafts and silent timing gears for practically all cars.

Order from your jobber or our nearest branch or write for complete price list.

8
SALES
BRANCHES

Automotive Gear Works, Inc.
Factory and General Offices
Richmond, Indiana

Address Automotive Gear Co. at these addresses
Atlanta, 174 Spring St. Los Angeles, 1213 S. Hope St.
Boston, 1151 Commonwealth Ave. Philadelphia, 1404 W. Girard Ave.
Chicago, 1425 S. Michigan Ave. Seattle, 520 E. Pike St.
Cleveland, 6305 Euclid Ave. Richmond, Ind., Factory

Double Diamond Gears

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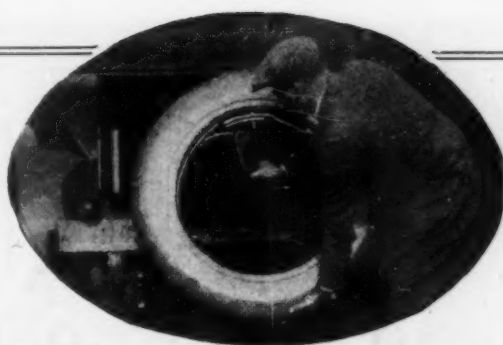
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THE HATFIELD TIRE CARRIER AND TRUNK EQUIPMENT for HUDSON and ESSEX Cars



Most simple to operate—
yet holds like iron.



Detachable. Can be
moved or placed any-
where you choose.

SIMPLY pull down the lever on the Hatfield Tire Carrier—and the rim is released instantly.

Eccentric lever expansion principle holds the rim (with wire) in a vise-like grip—and when locked it is thief-proof. No straps—no nuts—no prying rim loose. Nothing to tinker with. A one hand pull and the tire and rim come off easily, quickly and neatly.

2 Big Exclusive Features for Hudson & Essex Cars only.

The Hatfield Trunk Equipment—snappy design, yet strong and rugged. Water and dust proof—can be quickly detached. Simply unlock a clasp at one end.

Literature and prices will be sent immediately upon request. Big sellers. Write today.

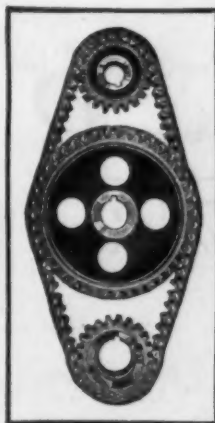
Hudson and Essex Dealers are cashing in on these 2 Big Features.

THE BRADLEY MOTOR PRODUCTS CO.
FOSTORIA OHIO

OVER 50,000 MILES NOW REPORTED ON “WHITNEY”

High Efficiency

FRONT END MOTOR CHAIN DRIVES
AND STILL IN GOOD CONDITION



NOT ONE OF
THESE
CHAINS
HAS BEEN
KNOWN
TO SKIP A
SPROCKET
TOOTH

Interchangeable
on the
Sprockets
Furnished with
the Car



The Whitney Mfg. Co.
HARTFORD, CONN.

SALABILITY—II

**“Half the Salesmen in Town
Want to Sell the Stephens”**

Certain keen automobile salesmen seem to have developed a sort of sixth sense for anticipating the year's "best sellers" among motor cars. The moment a car shows signs of breaking into this select circle, their applications for jobs pour in.

Mr. R. S. Cole, Stephens Distributor in the New York Metropolitan District, reports such a flood of applications from both wholesale and retail salesmen who were quick to sense the *salability* of the new Stephens line, at its first showing on Broadway.

Two of our leading dealers in the Middle West have had the same experience. One of them also complains humorously that he is finding it difficult to get his salesmen to divide their time fairly between the Stephens and another and lower-priced line he handles. "They all want to show and sell the Stephens," he declares.

There are a few territories in which we can offer direct factory contracts still open for dealers of Stephens caliber. Write to Moline today for our "salesroom in print" catalogue, showing the seven great Stephens body types in actual colors. Let us give you the facts about our money-making dealer proposition.

STEPHENS MOTOR CAR COMPANY, INC., *Moline and Freeport, Ill.*

STEPHENS

Finer Motor Cars  *At Lower Prices*

Send for full-color catalogue and contract terms to dealers today

Introducing the **WILLIAMS** Junior Accelerator

A Real Foot Throttle for the Medium Price Trade

An article that has back of it the basic mechanical principles and perfection of design that have made the regular Williams Accelerator the recognized leader.

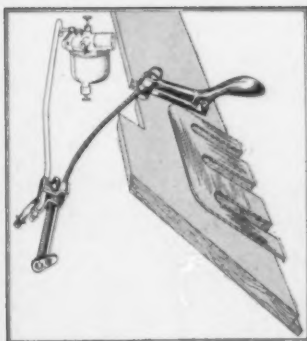
The Williams Junior Accelerator requires only two connections and can be installed in a few minutes. It operates efficiently and easily with direct action on the carburetor.

It is packed in an attractive, two colored carton, is being advertised in national mediums and will move fast because it has no equal at the price.

Order from your jobber immediately, you will find it a profitable item.

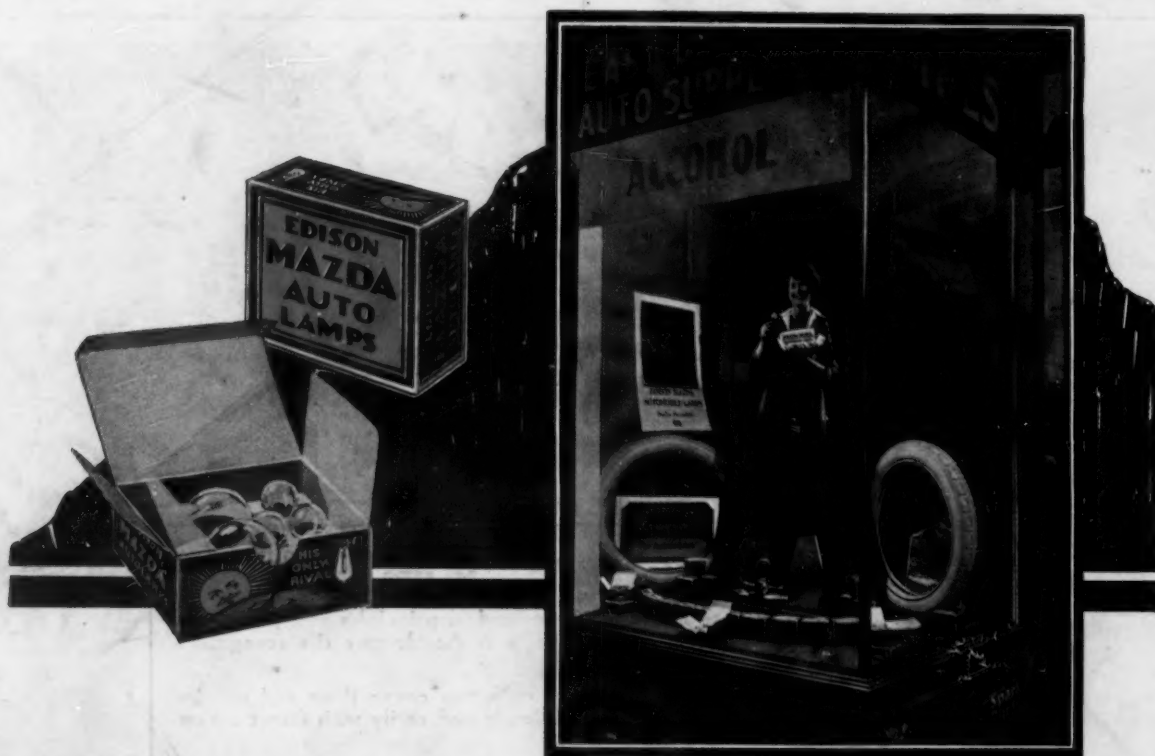
Anticipate the heavy dealer demand by ordering at once. Advertising literature now available.

WILLIAMS BROS. AIRCRAFT CORP.
SAN FRANCISCO, CALIF.

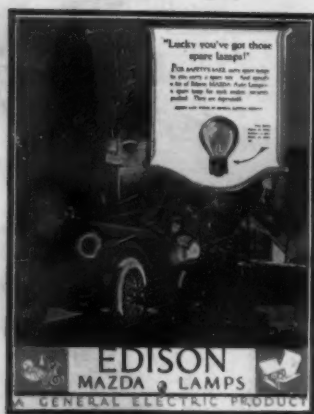


\$1.50
Best at
the Price





Sell six lamps instead of one— like Leo Shaffer does



The first of the 1923 auto lamp kit advertisements—a full page, in two colors in the Saturday Evening Post for January 27. During February, advertisements will appear in *Colliers*, *Red Book*, *Life*, *Farm and Fireside* and *Successful Farming*.

Ask your jobber about our plan of dealer cooperation to help you sell six lamps instead of one.

LEO SHAFFER is manager of the East Orange (N.J.) Auto Supply Company, whose window is shown above. He said last month:

"Recently I have been keeping a record of the number of customers asking for auto lamps. Out of 52 customers, I sold the Edison MAZDA Lamp Kit (containing six lamps) to 24, or a total of 144 lamps. Thus I sold 120 additional lamps by the use of a kit. All I had to do in most cases was to show the kit and explain what it was for. I also find Edison MAZDA Lamps the easiest selling article on the shelf."

Mr. Shaffer's story is typical. Carry *dependable* Edison MAZDA Lamps and the handy kit, "ask 'em to buy," and you will sell six lamps instead of one. For particulars write your jobber today.

**"Carry a kit of spare lamps
as you carry a spare tire"**

This message will be carried to the car drivers of the country practically every week of 1923 through Edison MAZDA Auto Lamp advertisements in six national magazines, reaching 5,000,000 homes of the car owning class.



EDISON

MAZDA LAMPS

A GENERAL ELECTRIC PRODUCT



